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THE BUILDER

A JOURNAL FOR THE ARCHITECT AND CONSTRUCTOR

WITH WHICH IS INCORPORATED "THE BRITISH ARCHITECT."

CXXVII.—No. 4262. OCTOBER 10, 1924.

OUR OLD BRIDGES

NOTWITHSTANDING the prevalence of what we may call a very sensitive sentimentalism in these modern days, we are still much bound in our public actions by the grosser forms of utilitarianism and money values. We permit a freedom of speech which scoffs at long-cherished ideals. We note and control the deadly dangers of selling cigarettes after 8 p.m., but we allow street traffic to develop the most serious dangers to the amenity of city life. We allow food supplies to be exhibited and transported with no protection against the contamination of dust and dirt—we strain at a gnat and swallow a camel. Thus we are reminded with every fresh issue of the annual reports of the Society for the Protection of Ancient Buildings that it is with the greatest difficulty the work of that Society is carried to successful results in the endeavour to preserve to the country our old traditional beauties by road, river and hill. The present report has to deplore two signal losses, but there is much we are in danger of losing besides the more widely known and well advertised examples of ancient work. Who is there amongst those who delight in beauties of the road and field who cannot recall memories of many a charming old bridge which in its perfect setting of road, river, field, and trees, makes a picture always remembered with joy? Yet in the minds of thousands who set great store by common sense and practical values, the more uncommon sense of line, tone, proportion and colour, and the doubtful values of mere beauty do not count for much where the existence of an old bridge is concerned. How narrow, how steep, how unscientific it is! How it interferes with the progress of the motor car, how needlessly expensive to keep in repair! How completely out of touch it is with the guiding thoughts of modern life which insist on speed, luxury, economy and common sense! You could hardly defend these old bridges as they fall before the juggernaut of modern progress, for their remnant of good is only that they form the centres of pleasing pictures and keep alive something of our old traditions. We are, therefore, glad that the Society for the Protection of Ancient Buildings is directing attention to the danger of our losing many of the most characteristic and beautiful objects which our roadways can show. There is always a chance of sentiment and interest being worked up about the loss of prominent and well-known examples of old bridge building, but all over the country there still exist old bridges which are at the mercy of local councils and with little or no public sentiment to speak out for their preservation. In some cases there may be inexorable arguments for their destruction, but we believe that many might be preserved even if that involves keeping them as by-pass ways over streams and making a new way across at another point; they might at least serve for pedestrian or light traffic, and all motor vehicles forbidden their use. If the public feeling can be aroused to the value of beautiful things it may stem the tide of soul-destroying economies and mere dollar values. Of course this point of view may be decried with much show of reason, but if we still believe that life is more than meat and the body than raiment we shall see to it that amidst all the really necessary needs of modern progress and modern improvements we still cherish our priceless—and may we not say necessary?—heritage of beauty and charm.

Many a charming rural scene would lose beyond recovery its chief point and interest if it were robbed of an old bridge. The makers of our old bridges builded better than they knew, and whilst providing for practical necessities in the best way they could, were really endowing with lasting charm many an obscure spot in our countryside. Guided by a subconscious sense of values, in proportion and accent, they followed the paths of tradition in craftsmanship and detail so far as they would serve. Seldom, indeed, was any attempt made at purely ornamental effect, but ribbed arched soffits, quaintly spreading cutwaters, and varied arch outlines provided variety and interest to general outlines of great simplicity. All over the country from north to south and east to west our old bridges have given us a heritage of abiding delight, and we should see to it that this phase of building art may be treasured and preserved as far as practical necessities permit. That the march of progress must not be delayed we may fully agree, but by-pass roads, modern churches, great valley reservoirs, ferro-concrete bridges, and the like present-day developments should not be allowed to rob us of all the special values attaching to old values in traditional building.

Much might be said as to the protection of ancient buildings in relation to the efforts which are being made to secure it. Even now, in the report before us, we have a note of wonder as to how "it could be credited that any civilised community would tolerate such a deed" as the destruction of the old Court House at Barking. And further on we read of the destruction of the Star Inn and neighbouring houses at Bury St. Edmunds, with the remark that "it is indeed deplorable that this loss should have come about at the hands of a municipality." A warning is uttered against any undue feeling of security as to the fate of the City churches and the necessity is urged of constant vigilance in the matter. If such illustrations as those we give from the report before us do not convince people of the charm and value of our ancient buildings, and the importance of a society for their protection, no further argument would probably count. We can only hope that increasing support will be given to a society which recognises the great value of our ancient buildings and devotes so much effort of a purely voluntary kind to enforce and preserve this value. A merely platonic interest in its work is not enough, for the report says the work which lies before the society is altogether beyond its present capacity, and if the wastage of ancient buildings is to be stemmed, a considerable increase in members and funds must be immediately obtained. We have dwelt specially on the importance of preserving old bridges, but the efforts for their preservation are often lost for need of a scientific report by an engineer of recognised ability to show that the Society's suggestions were practical as well as sentimental, and that it is able and willing to spend money in defence of a beautiful and interesting bridge.

This is only one example of the Society's need for income. To give another though an allied instance on the same subject. When the Committee learned that the Ministry of Transport had asked the County Councils to apply for grants for the widening or reconstruction of their narrow or otherwise inconvenient bridges, it at once approached the Ministry and was sympathetically received. It was told, however, that the Ministry had not the means to make so full an examination into the archæological side of the question as it would desire to do, but that it would welcome information from this point of view from the Society. The Society's staff is barely able to cope with the work that is normally before it, and to find out what bridges were threatened all over England and then to discover which of these were valuable was clearly beyond its capacity; that is for any result to be forthcoming soon enough to be of use.

Lord Howard de Walden made a very pertinent allusion to the acquisition of treasures for our Museums whilst we are letting slip away from us valuable ancient records such as cannot be housed in glass cases. For ourselves we deplore the vandalism that goes on abroad, and yet slowly the streets of our towns and villages are being stripped of their local character and distinction.

NOTES.

Slow and Costly Building.

IT is so difficult to overcome the inertia (arising from various causes) which bars the way to improvement and progress, that we welcome any signs of help which promise to break it down. Such help is, we think, to be found in the attempt by Mr. Bromley to arouse architects to some action in the fight against slow and costly building. We hope our readers will find in his paper on this subject, which we publish this week, some stimulus to more definite action by the profession. Mr. Bromley says the "ca' canny" cancer is sapping the industrial life of the nation. The price per cubic foot of building is about the same in America as in this country, though wages there are about double. Is it not worth while for the R.I.B.A. to sift this discrepancy to the bottom? It is to be regretted, says Mr. Bromley, that Sir Henry Tanner's letter published in *The Builder*, April 11, 1919, was disregarded. In this, he advocated a thorough investigation with regard to the cost of building, and suggested a mixed commission of the R.I.B.A., the Surveyors' and Builders' Institutes, and the trade unions. Is it wise for us to fold our arms and wait for others to do something? What can be done about this ca' canny blight and the failure of apprenticeship (once the glory of England)?

Housing Solutions.

WE do not feel there is much room for optimism in recent solutions put forward to meet the housing difficulty. Such schemes, even though able to provide us with all-steel construction houses, at one a fortnight, may prove of uncertain advantage, for we cannot eliminate other considerations, the gravity of which does not appear to be sufficiently regarded. To build in tens of thousands houses which hold no quality of character, is surely not the only way to meet such an emergency. It would seem almost as though some paralysis had fallen over the wits of men, that we cannot find it possible to build in more attractive and becoming character. In any case, do not let us, if the machine is to replace the man, congratulate ourselves on having done much for the welfare of human life. We do not under-rate the urgent nature of the problem, but how it strikes a correspondent will be understood from the following suggestion: "Far better it appears to me than to surrender to the factory method would it be to subsidise directly the worker himself, and let him build his own house. Give the responsible workman, under suitable provisions, a sum of money, say, £250, and the land to build on, and let him make his own home. We do not find that large housing schemes prove less expensive; on the contrary, they are far more so. Such a scheme may not satisfy the theorist, but it appears that the alternative now offered is likely to be far worse than anything that the workman himself, with such an impulse directing his experience and practical knowledge, is likely to achieve." In any case, to eliminate, as is proposed, the skilled man as the solution of the housing difficulty, and to think that the "unsatisfactory output of skilled labour" is to be overcome by doing without him altogether, is not only mistaken but fraught with danger.

Work and Unemployment.

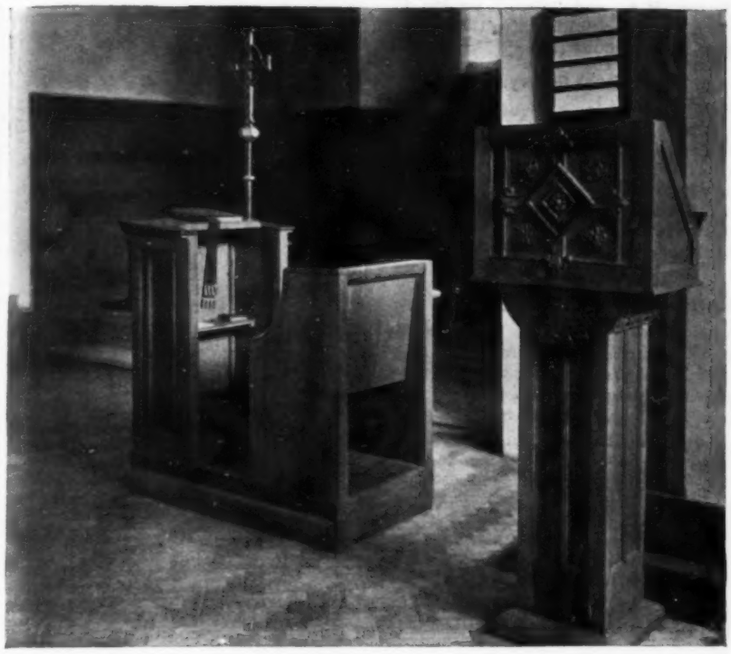
ANOTHER point of view in regard to housing is reflected in the following from a correspondent:—"There can be no doubt that behind all the other problems and difficulties which face us now there stands the dark shadow of unemployment as a standing menace to us all. No one with a spark of decent manhood should be content to receive a dole if there is employment to be had. Whilst the outstanding difficulty in the way of carrying out the great housing schemes is the shortage of skilled labour, we are burdened with unemployment because the labour we so urgently need is not available. Everyone is agreed that it is hopeless to expect we could carry out the Government housing policy with the skilled labour which is available. If buildings could be erected largely without skilled labour a great part of our difficulty would vanish. Here therefore is the opportunity for a new type of building, and demonstrations such as we have had during the last week have therefore a vital interest."

The Minister of Health.

MR. WHEATLEY, the Minister of Health, speaking at Birmingham on the housing question, is reported as having attributed the shortage of men and materials to insecurity which had prevailed in the building industry, and to have twitted Mr. Chamberlain with having done nothing to increase the personnel and material during his time as Minister, as though he himself had already accomplished the solution of both these questions, apparently relying as to personnel on new apprentices. But there are two sentences in his speech

From the Report of the Society for the Protection of Ancient Buildings.

The Old Post Office, Tintagel, Cornwall.



St. Philip's Church, Rugby.

MR. H. B. CRESWELL, F.R.I.B.A., Architect. (*See p.* 552.)

which, if correctly reported, are far more difficult to explain than the above statement, as, according to the report, he said in the first place that owing to rent restriction he was now in a position to take full advantage of the law of supply and demand, whilst almost in the next sentence he said that by the legislation he proposed he would suspend the law of supply and demand as affecting the price of building materials. How are these two statements to be reconciled one with the other? A restriction on rents, according to Mr. Wheatley, is no restriction on the law of supply and demand, whilst restrictions on the prices of building materials suspend that law. He went on to say that manufacturers and merchants by doubling output would be able to double profits without adding a penny to the price, and that may well be the case, but he did not explain how the restricted landlord was to make good his rent. We have always endeavoured to take an impartial view of the housing question, but it is difficult to do so when the Minister makes it a political question, as he did in his speech at Birmingham. Housing might well be left outside the political arena, but Mr. Wheatley in another speech even characterised a general election as "a class struggle."

Coal Smoke and Fog.

WITH the short and colder days of autumn and winter before us we may expect and shall no doubt get the usual fogs with which we are familiar at this time of the year, but whether they be vapour fogs, which are inevitable more or less all over the country, or smoke-laden fogs depends in some measure upon ourselves. The result of the general emission of smoke from chimneys is known to most of us, but in our familiarity with an evil we may lose sight of its extent. Lord Newton, who was chairman of the Ministry of Health Committee on Smoke and Noxious Vapours Abatement, puts the case with some force when he says, "Smoke is a national nuisance. It is injurious to health, partly because it pollutes the air we breathe, partly because it hangs over our towns and cities and deprives their inhabitants of the beneficent effects of sunlight. It affects seriously all buildings and all forms of vegetation. It is costly in many other ways—in creating fogs, for example, with all their concomitant accidents and delays, and in adding vastly to the expenditure on washing, lighting and decoration. And lastly, owing to the incomplete combustion of raw coal, it incidentally represents a considerable misuse and waste of our limited fuel resources."

From the Report of the Society for the Protection of Ancient Buildings.

Rowsley Bridge.

GENERAL NEWS

Obituary.

As we go to press we very much regret to learn of the death of Mr. Thomas E. Collcutt, Past-President of the Royal Institute of British Architects, who passed away on Tuesday at the age of 84.

Professional Announcements.

Mr. F. Malcolm Burr, M.S.A., has removed to 30, Finsbury-square, E.C.2. Tel.: Clerkenwell 1553.

Mr. F. E. Wapshott, M.S.A., F.S.I. (formerly Chief Surveyor for the South-Eastern Counties at the Ministry of Health), has resumed private practice as architect and quantity surveyor at 139A, High-street, Tonbridge, Kent. Tel.: Tonbridge 360.

Mr. S. Lunn Whitehouse, L.S.A., has opened an office at 3, New-street, Birmingham.

The Surveyors' Institution.

The first ordinary general meeting of the Session 1924–5 will be held on November 10, at 8 p.m., when the President (Sir Edwin Savill), will deliver his opening address.

Brighton School of Art.

Mr. J. L. Denman, A.R.I.B.A., is giving, on Friday evenings, lectures on architecture at the Brighton School of Art. In each instance technicalities are avoided so that they may be comprehensible to the uninitiated.

Soane's Museum.

An interesting House and Art Collection is now open free to the public at Sir John Soane's Museum, 13, Lincoln's Inn-fields, on Thursdays and Fridays in October, from 10.30–5, and will continue open on these days in November, from 10.30–4.

"R.A." Railway Posters.

Three more posters of the "R.A. Series" have been produced by the London Midland and Scottish Railway, and will be exhibited at the principal stations on the system during the present week. These are "Warwick Castle," by Mr. Adrian Stokes, R.A., "Conway," by Sir David Murray, R.A., and "Coal," by Mr. G. Clausen, R.A., a further addition to the posters representing British Industries.

The National Gallery.

The collection of pictures bequeathed to the Nation by Dr. Ludwig Mond is now arranged at the National Gallery in Room XXVI, where the group of Wertheimer portraits by Sargent has recently been hanging. The works exhibited comprise the whole of Dr. Mond's Bequest to the Gallery, with the exception of the famous Mantegna "Imperator Mundi" and two panels by Cima.

British Commercial Gas Association.

Mr. John Henry Ellis is the newly-elected President of the British Commercial Gas Association, which has just concluded at Liverpool its thirteenth annual conference.

COMPETITION NEWS

Harrogate Infirmary.

The assessor, Mr. S. D. Kitson, has made the following awards in this competition:—(1) Messrs. Elcock & Sutcliffe, 21, Northumberland-avenue, W.C.2; (2) Messrs. Lanchester, Lucas & Lodge, 19, Great Russell-street, W.C.2; (3) Professor Beresford Pite, 19, Great Russell-street, W.C.2.

Dundee School Competition.

Mr. John Arthur, the assessor, has made the following awards in the competition for designs for the new advanced school in Blackness-road, for the Dundee Education Authority:—(1) Messrs. Maclaren, Soutar & Salmond, (2) Mr. J. O. Allan, Aberdeen, (3) Messrs. Allan & Friskin, Dundee.

Monument to Sir Wilfrid Laurier.

In this competition, a design submitted by Mr. Emile Brunet, a Montreal sculptor, has been accepted by the Canadian Government for the memorial which is to be erected on Parliament Hill, Ottawa.

From the Report of the Society for the Protection of Ancient Buildings.

16th-Century Court House at Barking now demolished.

Other Competitions.

Other competitions still open include the following (the dates given are, first the sending-in date, and second the issue of *The Builder* in which full particulars were given):—Masonic Hall (May 1). Manchester Art Gallery (Jan. 30; Aug. 22). Concrete Cottages (Oct. 31; Sept. 19). Christian Science Church, Southport (no sending-in date announced: Sept. 26). Barrow Hill Memorial Club (no sending-in date announced; Sept. 26).

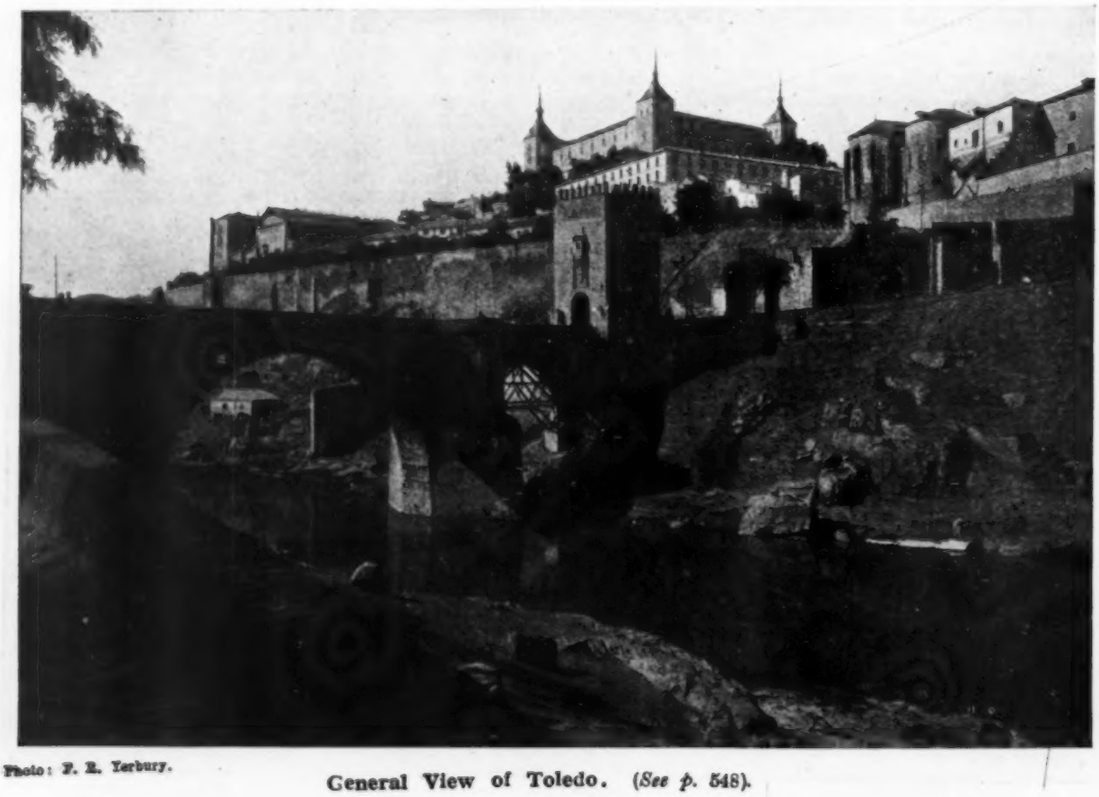


Photo: F. R. Yerbury.

General View of Toledo. (*See p.* 548).

PEACE IN THE BUILDING INDUSTRY

In our leading article last week we referred to the need of peace in the building industry, and the apparent want of confidence between the two parties, the Federated employers and operatives, who regulate the wages and conditions on which peace and smooth working depend in an industry of enormous importance to so many allied interests. We suggested that as the peace which we should like to see established has not been secured by the direct negotiations of two of the principal parties named, a third and no less important party than the other two, *i.e.*, the building owner represented by the architect, should take some part in discussions and decisions which affect him as vitally as anyone, and that for the purpose another attempt should be made to set up an Industrial Parliament for the Building Industry in which representatives of the architectural profession should take part as they did in some measure during the short existence of the Industrial Parliament which was formed in 1918, but which came to an end in 1922 for reasons explained in our last issue. In making these suggestions last week, and in repeating them in this issue, we do so without any conscious prejudice, nor do we believe that this failure to achieve peace in an industry of such vital importance to the nation as a whole is due to any indifference to the welfare of the industry, or that either the building trade employers or their operatives are lacking in good will. On the contrary, we believe they are just as anxious as anyone to arrange lasting terms and conditions which will not be liable to violent alteration with little or no warning. But the fact remains that for some reason or other there is considerable unrest in an industry which, considering the years of work which are before it, should have long ago settled down to carry out that work, and because of the unsettled condition of the industry and because we believe that the building owner, whose interests are at least as important as those of any other party concerned, should be represented through his architect, that we have suggested the resuscitation of the Building Trades Parliament, or the creation of a similar body.

Judging from the letters and communications we have received since our last issue, our suggestion has been very favourably received, and in addition to the letters we print below we have ascertained that there would be considerable support, at all events from the architectural profession, for a scheme for the creation of such a body. We believe we are right in stating that the profession heard with regret of the dissolution of the Building Trades' Parliament, and that the R.I.BA. offered their services during the recent strike to each side impartially. From what we know of the circumstances, we have little doubt that the Council of the R.I.B.A. would support any well-considered proposals for a meeting with the employers and operatives whereby a joint Board, satisfactory to all parties would be established. We say this because the architect, as the custodian of the interests of the building owner, knows that without the fullest co-operation of all parties concerned in the successful execution of building contracts, the interests of all parties, including employers and operatives, are bound to suffer.

MR. SYDNEY TATCHELL, F.R.I.B.A., writes:—

SIR,—In supporting the views so admirably expressed in your leading article of the 3rd inst., it appears to me that too much emphasis cannot be laid upon the necessity for the inclusion of architects in the Councils of the building industry. Not only is he, equally with the contractor and the operative, dependent on the industry for his living, but he also represents his client, the building owner—upon whom, when all is said and done, the industry depends for its very existence, although this fact would appear to have been ignored throughout the recent negotiations.

The architect, as an arbitrator, would approach any difference between the operatives and employers with understanding, and his intervention would, in my judgment, do much to bring about a better feeling.

Underlying the differences which have arisen is the discontent felt by the skilled operatives from the knowledge that the unskilled in other occupations receive better rewards for their labour and without the long apprenticeship and the purchase and maintenance of tools which is their portion.

MAJOR HARRY BARNES, in the course of an interview, congratulated *The Builder* on its entering into a search for a way out of the present unsatisfactory state of the building industry, and said that everyone was on common ground in the desire for peace in the building industry. He said that up to the present the architect had been no party to adjustments of wages and conditions, and any suggestion that he should share in these adjustments required careful consideration.

He held strongly the view that there might be much closer co-operation on the part of architect, builder and operative in promoting a high standard of craftsmanship and material in the industry.

In this province there was much ground for agreement and little room for dispute, and he would be very slow to take any step that would imperil the prospect of such a growing co-operation.

On the proposal that architects should sit as a joint board together with builder and operative for the purpose of reconciling differences as to wages and conditions, he was very doubtful. Such a position would not only be very onerous, but also very delicate, involving all the difficulties of arbitration without its decisiveness.

On the suggestion that the architect might act as arbitrator in appeals by either or both parties he was more inclined to look with hope.

The builder was at the present time prepared to accept the decision of an architect arbitrator on differences with the building owner as to the proper remuneration of the builder, and it might be that the operatives would be ready to extend the same confidence to the architect.

It appeared to him that if the Royal Institute of British Architects received a clear indication from both parties that they would favourably consider the establishment of a permanent tribunal for the settlement of disputes in the building industry consisting of, say, three architects, assisted by technical assessors, one from the operatives' side and one from the employers' side, it would no doubt feel the responsibility of the situation and with the greatest earnestness consider whether such a position could be advantageously to all parties and the industry as a whole taken up by representatives of the Institute.

Without some such indication he thought it hardly likely that the Institute would feel itself justified in initiating such a proposal.

MR. JOHN E. YERBURY, Lic.R.I.B.A., writes:—

SIR,—I have so often advocated the creation of a wider Joint Council for the Building Trade, and expressed the regret I have always felt at the failure of the Building Trade Parliament that I am delighted to find in your leader for October 3 an appeal for further consideration and for a scheme prepared by architects.

It is all too obvious that there is at the present time a complete lack of confidence between the two parties directly affected by the almost continuous strikes and lock-outs which have disorganised the industry. There is very little doubt that both sides are badly led, inasmuch as the leaders on both sides are inclined to be Napoleons rather than Solomons. In your columns—and others—I have constantly advocated a Conciliation Council or Joint Board, with representatives appointed by the two parties directly concerned and by the community they serve; and I have many times pointed out that public opinion can always decide the result of strikes or lock-outs and therefore should be well informed as to the facts. Absolute truth being unattainable, what is honestly held to be the truth will prevail; propaganda to gain the public support is resorted to by both sides, and justice is not necessarily done by a settlement brought about by this means; and where public opinion is long in doubt it is the long purse which wins.

In 1912 (I think) I first put forward the suggestion in your columns many times repeated since, that the most satisfactory Council for the building industry might be set up in the following manner, by the appointment of representatives from—

a. Each of the Operatives' Trade Unions	say 12
b. An equal number of Employers ..	„ 12
c. An equal number from the Community appointed by Operatives ..	„ 12
d. An equal number from the Community appointed by Employers..	„ 12

An independent Chairman appointed by the Minister of Labour.

I have suggested that representatives under *c* might be chosen by such bodies as the Working Men's College, Workers' Educational Association, the Co-operative Wholesale Society, Club and Institute Union, The Settlement Association, and other bodies which exist for the object of helping the workers, and whose sympathies are assured.

Representatives under *d* might be appointed by the R.I.B.A., the A.A., the Surveyors' Institute, the Institute of Civil Engineers, Institute of Mechanical Engineers, and other professional bodies.

A permanent secretary of first-rate ability, an expert in building matters, would be appointed, and a proper constitution drawn up.

Voting should be by secret ballot, and decisions binding for a fixed period.

If those most concerned would accept such a Board there would be no great difficulty in drawing up a Constitution; but until the principle of giving a voice to the long-suffering community has been approved by the employers and the operatives it is not much use the new united body of architects "coming forward with a properly considered scheme."

There are many who are anxious to help towards reconstruction if their help is acceptable to those most intimately concerned.

Alloa War Memorial.

Alloa War Memorial was unveiled recently by Earl Haig. The Memorial, on which is inscribed the names of 350 men of the town who fell in the war, is from a design by Sir Robert Lorimer, A.R.S.A.

Aberdeen Art Diplomas.

The governors of Robert Gordon's College, Aberdeen, had reported to them recently that the diploma of the Aberdeen School of Art had, on the authority of the Scottish Education Department, been awarded as follows: In drawing and painting (5)—Caroline E. Calder, James H. Gair, May Johnston, Marjory Lorimer, and Margaret Mitchell; in design and decorative art (3)—Ellen F. Finster, Lilia A. Marshall, and Dorothy Rose; in sculpture (1)—Jessie S. R. Johnston; in architecture (10)—Henry J. Brown, Arthur Campbell, James C. Clark, William Glashan, Frank A. G. Inglis, Robert S. Lawrie, Caroline M. Ross, Dorothy E. Sofer, W. C. Walker, and Thomas R. Wood. It was also reported that diplomas awarded in previous sessions to the students mentioned below, had, likewise on the authority of the Department, been endorsed in respect of the successful completion of courses of post diploma study: In drawing and painting—Andrew R. Summers; in design and decorative art—Winifred Mordaunt and Jeanie R. Reid; and in architecture—James S. Dawson and Alexander M. Stewart.

THE ARCHITECTURAL ASSOCIATION EXCURSION TO SPAIN.—I

BY A MEMBER OF THE PARTY.

To see Spain was even an ambition of mine, and the excursion arranged by the A.A. provided the final inducement of companions (in the words of Dr. Johnson) "whose acuteness would help any inquiry and whose gaiety of conversation and civility of manners are sufficient to counteract the inconveniences of travel in countries less hospitable than we have passed." It provided also the more practical benefits of a route selected, habitation secured, and the pleasing certainty that there would be someone with Spanish not restricted like mine to the word "manana." These expectations similarly reacting on some thirty other minds produced the 1924 excursion of the Architectural Association, of which the following diary is a bare and purely personal record.

September 11.—Paris. Found our party at the Quai d'Orsay Station somewhat shaken by a tempestuous crossing, but sufficiently alert to have seized all available corner seats.

September 12.—Irun, Spanish soldiers and Customs officials! Signor Mugurutza, the first of our Spanish architect hosts, appeared, and after a word from him we were slipped through the Customs without examination. The train picked its way among the Pyrenees, which do not adhere neatly to the border line, but sprawl over the country for fifty miles or so on either side. Any of the places we passed looked lovely enough to spend our whole holiday at, but the way of an architect is not among green pastures. Soon the country assumed an air more recognisably Spanish. Donkeys carrying panniers, and mules with citizens high perched on their sterns, contributed local colour; and small towns with white houses and ornate churches increased our assurance that we really were in Spain, till finally the name Vittoria painted upon a station settled the matter as effectively as that battle settled the Peninsular War. What is pardonable in Pepys may be considered irrevelant in an architectural diary, and I reluctantly refrain from a fully detailed account of our first Spanish meal, with its surprising variety of meats and its generous allowance of olive oil. Suffice it to say that this lunch, combined with the warmth of the train, introduced many of our party to the charms of the siesta.

The Ebro was crossed and another landmark reached—Burgos, with its cathedral plainly visible. The west front looks somewhat spiky and deficient in scale, but we never had an opportunity of examining it, or the town, which had a most attractive air. Thereafter valley succeeded valley, each bounded by hills and each tawnier and barer than the last as we approached the bare plateau of Old Castile. Now and again small woods of umbrella pines appeared, and, where irrigation existed, a few vines; but in general the landscape had almost the effect of a desert, and an occasional distant town or village had in the clear air a strangely unreal appearance. Farmhouses or cottages there were none, and apparently cultivation, if it exists, is conducted from the villages. At Medina the beautiful brick-built Castillo de la Mota presented itself to our view, and later, when the sunset had turned the whole landscape into a sea of red and gold, we espied Segovia. A moon almost at full rose from behind the Sierra, and a great enchantment fell upon us.

Then Madrid, greetings from Signor Gatierrez and other gentlemen who were later to prove the extent of their kindness, a flash-light photograph, and a long drive through the streets of a strange city. Finally the Residencia de Estudiantes was attained, dinner (at 11 p.m.) eaten, and after a stroll in the moonlight we retired to bedrooms of monastic simplicity and impeccable cleanness.

September 13.—A free day! The Residencia, with its red-brick walls and broad eaves and green tiles, looks charming in the brilliant sun, as does Madrid with its wide tree-planted boulevards. To the Prado Museum, where a feast of Velasquez, El Greco, and Goya awaited us. The variety of Velasquez astonished one. Las Meninas and the Philips I had anticipated, but not the joyful Los Borrachos nor the exquisite little landscapes. Goya, too, delighted me; but El Greco I failed to comprehend. Madrid is very much a modern city, and it is quite easy to avoid seeing anything of it older than the eighteenth century. A system of parks and boulevards lies to the east, and another to the west, and towards these the most important streets radiate from the central Puerta del Sol. By means of irrigation the trees that plentifully adorn the boulevards retain their freshness even in September, and, thanks to these and to the clear air and brilliant sunshine, the best parts make a brave show. It must be confessed that few of the modern or semi-modern buildings show a very high standard of architectural merit, but there is nothing petty or timid about the building projects, and new constructions seem to be plentiful. We strove this day to enter into the inner life of the city by attendance at cafés. Shoes are immediately "shined" when one sits down, so that in Spain, apparently, your tippler is revealed by the lustre of his feet.

September 14 (Sunday).—Up betimes, and by train to Alcala de Henares, which lies to the north-east—no distance by the map, but the train makes much of it. We were met by the Mayor, who in person conducted us to the ancient University, which once boasted 12,000 students—more than the present population of the town. The façade of the college is delightful in its golden-coloured stone, with baroque windows and doorway. Sad to see so much of it mouldering to a ruin. The lecture hall has a low gallery and a wall pulpit and coffered ceiling, both richly coloured. Churches there were in plenty—the little chapel of the University with a Moorish ceiling in wood; Sta Maria, with a curious curly Gothic vault; Sta Magdalena, in rich Baroque; and the fine collegiate church, known as La Magistral, now being rather painfully restored. The finest building is the old Palace of the Archbishops of Toledo. Its patio, surrounded by a two-storied arcade, has exquisite detail, and there are handsome rooms within—over-restored alas! Not yet fully equipped with the steel legs and rubber neck of the complete tourist, we returned to Madrid wearied, but not without having first raised our voices in a shout of "Viva Alcala" to the Mayor, who had nobly waited with us for the train a whole hour.

September 15.—Toledo is a large programme for a single day. It seemed so before we started; much more so when we had finished. There is something terrible and barbaric in its setting. The yellow Tagus flows in a deep gorge round the rock on which it stands, and all around lie bare sun-baked hills. A narrow bridge takes us across, and we enter the labyrinth of narrow streets by a Moorish gateway in the walls. Jews and Romans, Goths and Moors and Christians all have left their mark on Toledo. The last-mentioned have left in the cathedral the greatest monument that the city possesses, and it is in many respects the finest in Spain. Hemmed in as it is by buildings, it is difficult to get a satisfactory view of the exterior, which reflects the long period of nearly three hundred years during which building went on. Most remarkable to our eyes was the effect of vastness produced by the lofty double aisles, almost equal in themselves to the nave of some English cathedrals. The choir and high altar, enclosed as usual in Spanish cathedrals, have the appearance of buildings within a building. Their richness is dazzling, and the brilliant light falling from the magnificent series of stained-glass windows adds colour of the most gorgeous kind. Here, more than anywhere, one derives an impression of the wealth and power of the Church in Spain. Several churches of Toledo were originally mosques or Jewish synagogues. Santo Tomé is an example of the first, and Santa Maria la Blanca of the second. Its horse-shoe arches and arabesque patterns show clearly enough that it was built by Moorish workmen, and the strange capitals which were added by the Christians are more interesting than attractive. The exterior of the convent of San Juan de Los Reyes makes a very interesting composition with its richly ornamented octagonal lantern. The double-storied cloisters are most ornate and full of vitality, but the interior of the church is scarcely as fine as we had expected. As an interlude from sight-seeing we enjoyed the hospitality of the Mayor of Toledo, who received our party at the Ayuntamiento (Town Hall), and as an additional relief from the prevailing ecclesiasticism we enjoyed a visit to the most charming house of El Greco, which contains a great many of the smaller works of that master.

September 16.—To avoid congestion of the mind, another "free" day has been granted us in which to see a little more of Madrid. The sixteenth-century bridge of Segovia, the pleasant Plaza Mayor and the little Baroque church San Justo were the best things we saw; but after lunch it was announced that we were to visit the royal palace at the invitation of King Alfonso. The palace is a sound, if not altogether inspired example of mid-eighteenth-century architecture, and is most effective when seen from the low ground which falls rapidly away on the west. The interior is almost never accessible, and we were greatly favoured in being allowed to see it in its entirety, for many of the rooms are magnificent. Innumerable tapestries decorate the walls, many of them after Goya, and the Camara de Girardini stands out as one of the most delightful rooms I have ever seen. It has a ceiling of porcelain in a Japanese baroque manner, and walls of richly embroidered silk. After walking through several miles of apartments our flagging energies were revived by a royal tea and a few graceful speeches were made on both sides.

September 17.—The main party started very early for Segovia, proceeding thither *via* Avilla, but a small group who had danced in the morning revolted and took a leisurely afternoon train direct to Segovia. I understand that by so doing we missed some very fine and impressive architecture and scenery, but at all events we arrived fresh and in proper mood to appreciate the charm of the place. It is set on a hill amid surroundings that are more fertile and friendly looking than most of the Spanish towns, and with sunset the naturally red colours of the landscape assumed marvellous tints. Our first evening there was full of pleasure as we made the acquaintance of the aqueduct, the cathedral, and the little square full of soldiers and citizens.

Liverpool Architectural Society: The Honan Scholarship.

A travelling scholarship of the value of £50 for one year is open to members of the Liverpool Architectural Society under the age of 30. In computing the age the time spent in war service may be deducted. The scholarship will be awarded for the best design submitted for a residence on a site fronting a boulevard. Competitions, marked "Honan Scholarship," are to be delivered at the Society's Rooms, 13, Harrington-street, on January 1, 1925, and candidates must have been Associates or Students of the Society on December 31, 1924.

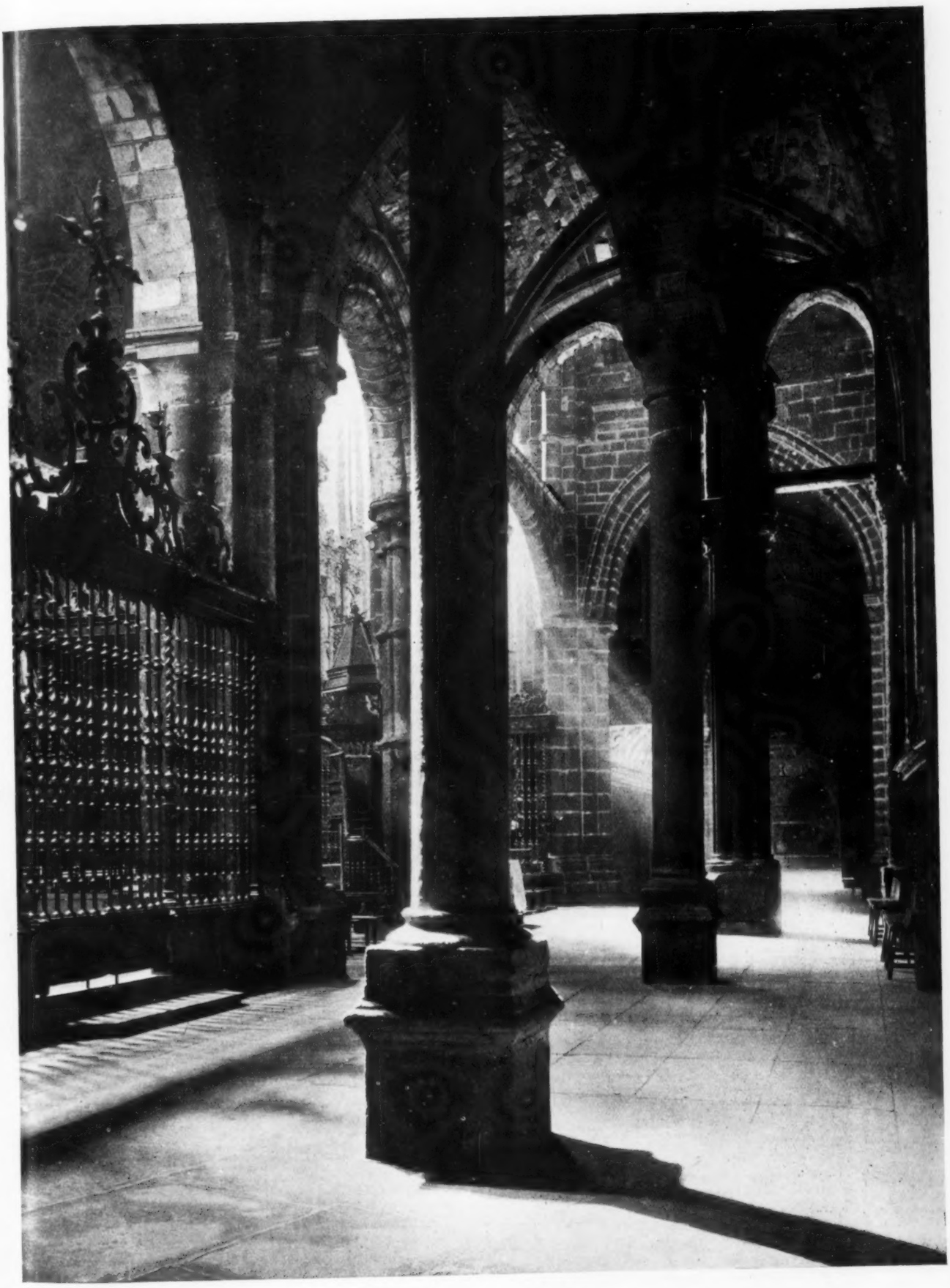


Photo: F. R. Yerbury

Avilla Cathedral. (*See p.* 548).

THE IMPERIAL COLLEGE OF TROPICAL AGRICULTURE, ST. AUGUSTINE, TRINIDAD

THE various illustrations which we publish this week of this college are from the sketch designs and working drawings for the College, prepared by the architect, Major H. C. Corlette, F.S.A., F.R.I.B.A. The perspective view was drawn by Mr. H. Chalton Bradshaw, A.R.I.B.A., and the model from which the two photographs were taken was made by Mr. J. B. Thorp, of 98, Gray's Inn-road. This model, with another of the sugar factory now being erected, is exhibited at Wembley, in the West Indies Pavilion. The north wing only of the College is being built at present, and will be completed this year. The long elevation for a comprehensive scheme is merely a preliminary study, suggesting a method by which the north wing now being built can be extended if required to provide for future needs.

Both the general plan and the elevation of the north wing have been revised since the preliminary designs were prepared. Strict economy was an essential condition to be observed in working out the plans and external elevations; and in accepting this requirement, the endeavour has been to rely upon practical planning and structural essentials for the production of any architectural quality. Tropical conditions of climate and the purpose for which the building was required were, therefore, allowed quite freely to dictate what the structural and architectural form might be without regard for preconceived ideas of archæological "style."

The first necessary condition to be observed was to keep the building indoors as cool as possible. Conditions of cost did not permit the provision of galleries or verandahs, on the north and south ends. But these parts will be sufficiently protected by other methods. The need for a free movement of air through the building was met by exposing all the laboratories and class rooms to the prevailing east winds. This involved a building with as much of its length as possible spreading north and south, with open galleries on the east and west fronts. These galleries are a practical necessity, but they also have a definite architectural value by giving variety to the building which grows naturally from the changes produced by contrasting those parts in high light with those in more or less deep shadow. The projecting portions in the centre, and on the north and south, should also help in the same way. Structurally, the building is a simple application of the use of supporting posts and beams, carrying the floor and roof slabs, with necessarily much repetition. All the work is being executed in reinforced concrete. The building, when completed, will be left as it is to bleach in the sun, after the removal of the shuttering. The cornice is an essential structural member of the building, and not only an architectural device. It forms part of the roof slab which is carried out to overhang the vertical line of the walls and piers, and provides a deep shadow down the external surfaces. It is supported underneath by small cantilever beams which run out above each of the piers; and between these another light beam is used to connect with the cantilevers and, at the same time, produce the outer member of the cornice itself. The flat roof is asphalted and whitewashed. There are practically no outer walls as such. The whole space between the piers is occupied by steel casement windows, or doors where required under the galleries, and teak louvres, which, in most instances, are made to be movable. Inside the casements, behind the glass, where no galleries occur, provision is made for hanging Venetian blinds made of corrugated aluminium slats. These will give a necessary control over the amount of light admissible at certain times of the day, and reduce what is known as "sky-glare." With the various precautions indicated, it may be said that the aim has been to provide what might be called a practical educational workshop, under tropical skies, in which a maximum inducement to mental activity is to be encouraged by conditions that may, it is hoped, be accompanied with a minimum of physical difficulty.

The local river gravel and sand used for the concrete with English cement is already taking a greyish-white colour, something like Portland stone. This will help the general colour scheme in view by effectively aiding the clear definition of lights and shadows. Other elements of colour will be introduced by the windows, with their panes of glass, and the louvre blades. The steel frames of the windows and doors, and also the Venetian blinds, will be painted green. The teak louvres, having sufficient oil naturally in their composition, will be left as they are, and not painted. In the parapets, cornice and sill courses, and the caps and bases of the piers, a little variety of colour is provided in detail by the use of narrow red tile bands.

The planning of the building has been made as flexible as possible, so that any extension of the main structure if required can be simply provided for and any re-arrangement of the internal accommodation adopted as occasion demands. The spacing of the piers, except in the west projecting block, follows a uniform dimension, so as to reduce costs, simplify the construction and calculations for steelwork and concrete, and the cutting of steel bars to the required lengths. The partitions dividing the several class rooms and laboratories are removable. This will facilitate the changes in the size or allocation of rooms, or the position of bench fittings, that may become necessary as the use of the College develops and new requirements become apparent. All the laboratory drainage has been arranged to meet such probable future needs, so far as possible. The necessary channels and "falls" for these drains are provided between the structural beams in the floors. The beams are treated as coupled or doubled beams, so that no structural part of the steel in them could be affected if any acids did succeed in getting below the channels.

The architect's local representative is Mr. H. C. Amies; and the general contractors, Messrs. Foster & Dicksee, Rugby and London; local representative, Mr. G. D. Brough. Sub contractors, &c.: specialist for reinforced concrete calculations, &c., Mr. A. A. H. Scott, 13, Old-square, W.C.; Cement and steel testing, Messrs. Davey & Bell, 37, Norfolk-street, Strand; cement, "Tunnel" Brand; steel for reinforcement, Dorman, Long & Co.; steel windows and doors, Henry Hope & Sons, Smethwick, Birmingham; asphalte, Thos. Faldo & Co.; laboratory and drain pipes Doulton & Co., Lambeth; glazing, Pilkington Bros., St. Helens, Lancs; septic treatment of sewage, Tuke & Bell, 27, Lincoln's Inn-fields.

St. Philip's Church, Rugby: Nave, Chancel and Aisle.

MR. H. B. CRESWELL, F.R.I.B.A., Architect. (*See p.* 552.)

COST AND SPEED OF BUILDING

AN interesting innovation in meetings of architectural societies took place on Tuesday, when Mr. A. Nelson Bromley, F.R.I.B.A., read a paper before the Nottingham and Derby Architectural Society and the officials of the National Federation of Building Trades Operatives.

He said some recent articles in the *American Saturday Evening Post* had encouraged him to return to the important subject of "Slow and Costly Building." The following was taken from a leading article in that paper for July 26, 1924: "Britain is in a bad way and there is no use in blinking the fact. . . . The housing shortage may go from bad to worse sooner than anyone now cares to predict. . . . *The London Spectator*, which is not given to intemperate statements, declares that it is a national scandal, and constitutes a national crisis. And yet it is men more than money that offer the most formidable obstacles to the proper housing of the British workmen. . . . The homeless cobbler has the homeless bricklayer to thank. . . . The number of persons engaged in the building trades is smaller by 100,000 than it was in 1913. This is not due to lack of demand for labour, but to the oppressive control exercised by Building Trades Unions over the number and ratio of apprentices permitted to be enrolled. . . . These arbitrary regulations have lately been somewhat relaxed but not to any decisive extent. . . . The contractors and the profiteers in building materials are tarred with the same brush."

When he visited the United States in 1913 he found the price per cubic foot of building was about the same as in this country, and that with wages about double in America. His partner, Mr. Watkins, who had this year returned from the States, practically found the same thing.

He trusted the Royal Institute of British Architects would sift this discrepancy to the bottom. It was to be regretted that Sir Henry Tanner's letter published in *The Builder* of April 11, 1919, was disregarded. In that letter he advocated a thorough investigation in regard to the cost of building, and suggested a mixed commission of the R.I.B.A., the Surveyors' Institution, and Builders' Federation and the trade unions. He sincerely hoped, however, that the Royal Institute would now take up this subject seriously, for he was of the opinion it was of vital importance to this country.

The excessive cost and slowness of building arose, in his opinion, from various causes:—

(1) The client frequently did not give the architect sufficient time to prepare his drawings. (The American generally took twice as long to prepare his drawings as we did, and in consequence built with astonishing quickness, thus saving his client unproductive capital and reducing the disturbance to business, if they were building additions, to a minimum, and also preventing loss and inconvenience to adjoining owners. The question of all fittings and machinery should be settled by the client before working drawings were completed.

(2) The architect must have all details prepared before quantities were taken out, and should impress upon the client the importance of accepting estimates from builders who had a reputation for carrying out good quick work. Time was money, and if the work was carried out slowly a low estimate might prove the most costly in the end.

(3) The builder must have the best machinery for expediting his work. He must treat his men well and remember that within reason it was not so much a question of wages but of obtaining good, quick workmen. Some clients definitely refused to enter into contracts subject to increases.

(4) The manufacturer of building materials should remember that excessive prices bearing with them excessive profits, restricted the use of their manufactures, and that good profits could be made with a larger output at lower prices. The high cost of some materials used in building now tended to reduce the standard of new buildings so that cheaper materials had to be submitted.

(5) The workman must give of his best, and he would get better wages. The slowing down of labour was not only dishonest, but it produced unemployment and increased the cost of the workman's own living. The serious nature of the limitation of output could be understood from the following particulars given him from a trustworthy source:—A considerable number of houses were built in 1912, and again in 1920 similar houses were erected by the same builder. It was found that the number of hours taken by bricklayers and labourers in 1920 was practically double the number of hours taken in 1912. He must say, however, that many men had of late worked exceedingly well for his firm, and he felt sure that if architects would take the workmen into their confidence and point out to them the serious results of slowing down labour much good would result.

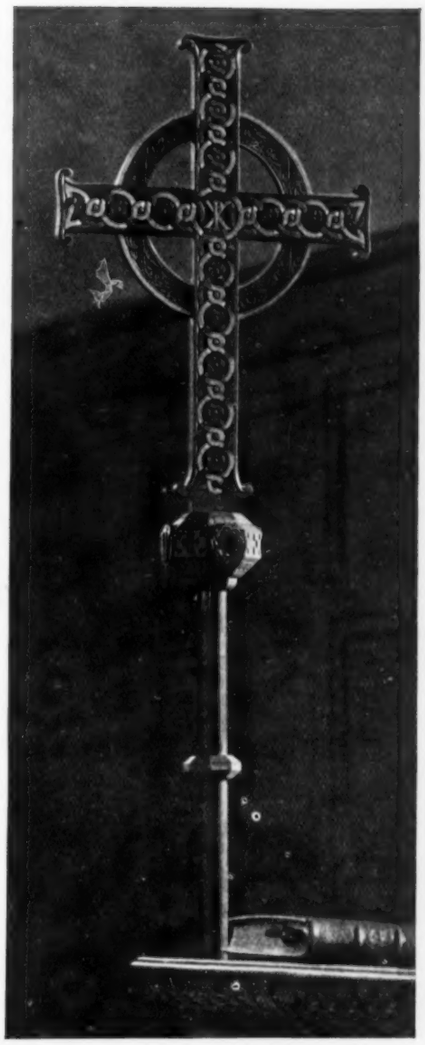
He again quoted from the *Saturday Evening Post*, July 19, 1924:—"A fundamental reason for a good deal of the British unemployment, for which there is no legislative remedy, lies in a stiff-necked trade unionism which, with its limitation of output fetish has done as much to prevent a return to the industrial normality as the dole. This, coupled with the strike, has contributed largely to the industrial plight in which Britain finds herself. . . . Not only is the British worker slacking on his job, but once at work, he is obsessed by a curious fear that someone else will get that job. . . . The decline of the apprentice system, once the pride and joy of British industry, is a startling revelation of what seems to be an impairment of the British productive mind. . . . In any analysis of the British business position you encounter on all sides the uncompromising fact that the normal high cost of production is a disturbing factor. . . . Hence, one fundamental cause of unemployment is that the products of British industry are too expensive for an impoverished world to buy."

The following was an extract from the book entitled "From War to Work," which gave the American point of view, which was exactly contrary to unfortunate English methods:—"We are not going to have the trouble here that Britain had with restriction of production. . . . There has not been any restriction on output for over 30 years in America. We, in the United States have followed an entirely different policy. . . . We say to the employers: "Bring in all the improved machinery and new tools that you can find. We will help you improve them still further and we will get the utmost product out of them. But what we insist on is the limitation of the hours of labour for the individual to 8 per day. Work two shifts if you please or work your machinery all round the 24 hours if you like, with three shifts, and we will help you, but we insist on the normal working day with full physical effort. We will not agree to that over-work, producing the poison of over-fatigue which destroys the maximum of production, undermines the health of the individual worker, and destroys his capacity for daily industrial effort."—[Mr. Samuel Gompers, President of the American Federation of Labour, representing 2,000,000 workers, in an interview on Labour and Dilution. *The Observer*, July 8, 1917.]

It should be remembered that our own Prime Minister had recently expressed himself opposed to the limitation of output, which coincided with the views of Mr. Gompers. How was it that the leading men in County Councils and Corporations did not also openly protest against this ca'canny abomination, which was apparent to the most casual observer? If the erection of industrial buildings was slow and costly and Government and County Council and Corporation works were equally so, rents and especially rates, added to the overhead charges of both manufacturer and shopkeeper, and the building trade worker and the architect must pay more for rents, clothes, food, and even amusements, in consequence.

He was distinctly of the opinion that the architect might do much good in discussing and explaining to the workmen the difficulties they had to face. It must be remembered that the architect found the work before the builder, and he knows from experience that slow and costly building was the great factor which prevented prosperity in this important industry, and if the workmen only knew how much work was abandoned by clients owing to the cost and slowness they would join with us in speeding up work by all possible means.

If there were only one building in course of construction in this country there might be something to be said for slowing down work and employing as many men as possible on that one job. But if building were cheaper and quicker more industrial and commercial work would soon be forthcoming. There is, of course, a great demand for workmen for housing schemes, but that does not assist manufacturers or commercial men; in fact, it only added to their overhead charges and made it still more difficult for them to compete in the markets of the world. The housing of workmen, however, must be provided, and the only way in which they could assist was in speeding up work to the utmost. He thought he had said enough to suggest that the architect was the right man for approaching this difficult subject. The architect was the first to move in a building enterprise, he had no direct interest in the profits on labour, and above all he was free from the blighting influence of party politics.



Cross at St. Philip's Church, Rugby.
MR. H. B. CRESWELL, F.R.I.B.A., Architect.

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ILLUSTRATIONS.

Imperial College of Tropical Agriculture, Trinidad.

A description of the Imperial College of Tropical Agriculture at Trinidad is given on p. 550. Major H. C. Corlette, O.B.E., F.S.A., F.R.I.B.A., is the architect.

Miners' Welfare Institute, Ilkeston.

The plans of this building explain themselves, but the large hall and the rooms in connection with it on the first floor are being designed so that they can be used independently of the Institute, separate entrance and exits being provided. Slipper baths are provided in the basement for both men and women, together with dressing rooms in connection with the recreation grounds which are at present only partially completed.

The building was officially opened on the 13th ult. by Sir H. Dennis Readett Bayley.

The chief contractors were Messrs. D. Roberts & Son, of Ilkeston; whilst the heating and ventilation were carried out by Messrs. Young, Austin & Young, of Leicester; and the electric lighting by Messrs. J. W. Furse & Co., Ltd., of Nottingham. The recreation grounds are being carried out by Messrs. W. Barron & Son, Ltd.

Mr. H. Tatham Sudbury, M.S.A., is the architect.

St. Philip's Church, Rugby.

This church has been built on a restricted site and, as is usual in these days, with limited funds, which placed the proposal in the category of mission churches. The design attempts to continue the tradition of English plan with the substitution of authentic brickwork for the characterless brick Gothic which has served this purpose so long. Churches have recently been built in the true tradition of Lombardic brickwork, but the present design sought to avoid an altogether exotic architecture. The compromise seems to have been a success for the building has attracted rather than repelled worshippers.

The walls are faced with small hand-made red bricks laid with a wide unstruck joint, and the whole of the interior is of plaster set with a felt-faced float for distempering. The "Italian" hand-made tiling of the roof is carried on scissor-trussed rafters which form the framework carrying the plaster barrel ceiling. By this device principals were eliminated and the walls kept low.

Heating is by low-pressure radiators, and ventilation by baffled inlets behind the radiators and by outlet gratings in ceiling opening into cross-ventilated roof space. Artificial lighting is by inverted reflectors on the indirect principle.

The contract price, omitting furnishings and transept entrance and campanile, was (in 1913) the equivalent of £4 12s. 6d. a sitting. The contractors were Messrs. Linnel & Son, of Rugby; the contractors for the tiling, Messrs. Ames & Hunter; and the reredos, font, and furnishings were made to the architect's designs, by Mr. Pyment, of Chipping Campden, and carving done by Mr. Miller, of Chipping Campden.

Mr. H. B. Creswell, F.R.I.B.A., was the architect.

New Premises, Glasshouse-street.

Messrs. Horace W. Cullum & Co. are carrying out the fire-proof floors at Messrs. Ford & Walton's contract at these premises, illustrated in our issue for September 26.

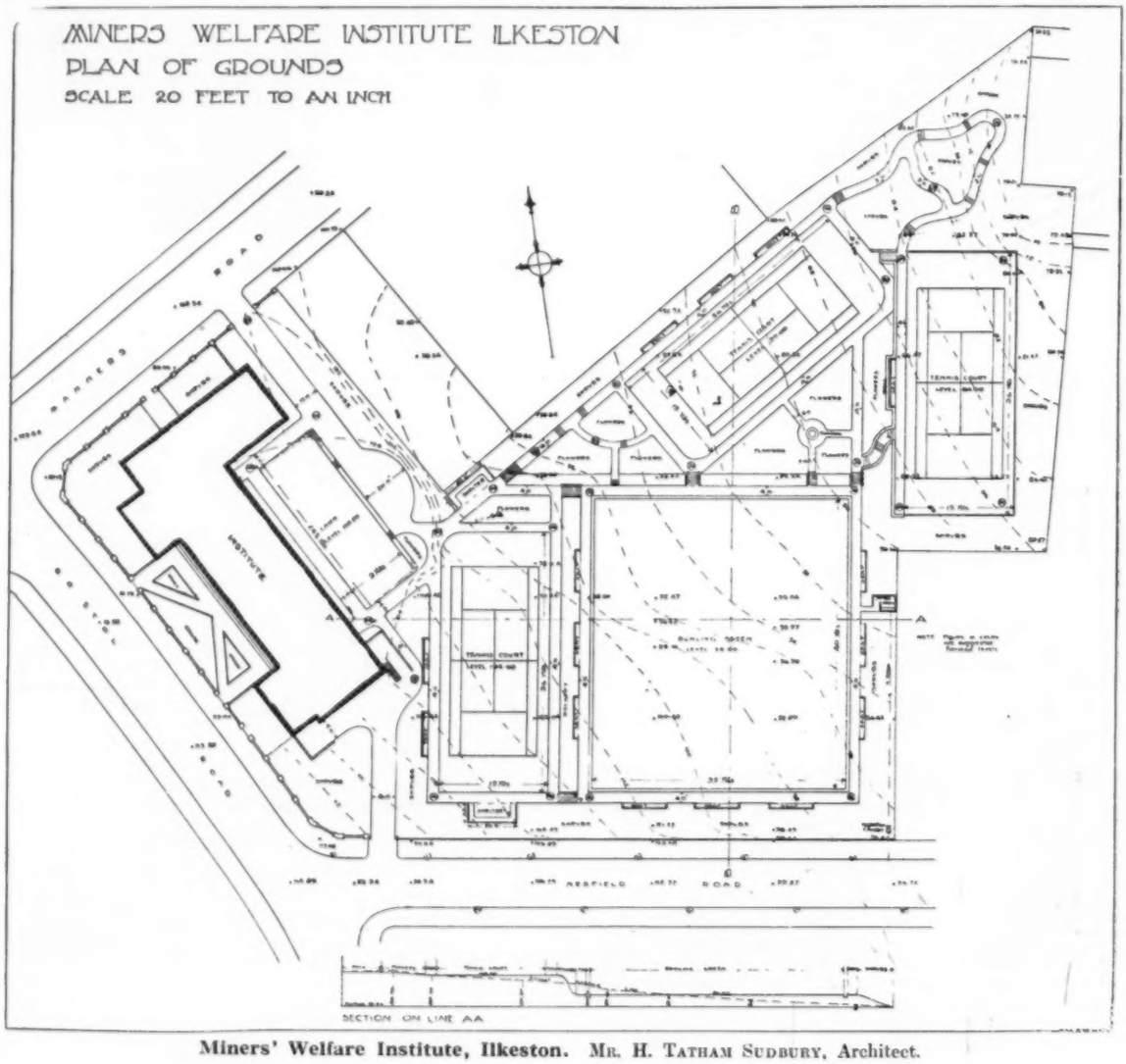
MEETINGS

SATURDAY, *October* 4.

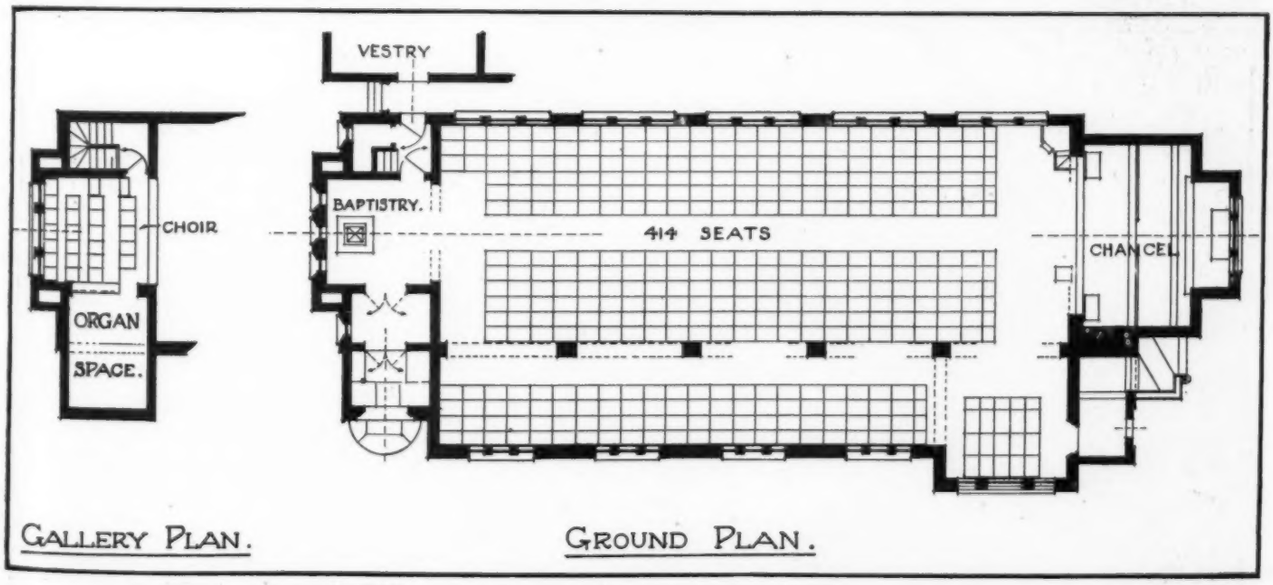
Architects' and Surveyors' Assistants' Professional Union.—Visit to Whitgift Hospital. 3 p.m.

WEDNESDAY, *October* 15.

British Society of Master Glass-Painters.—Sir C. Nicholson on "Architecture and Stained Glass." At the Art Workers' Guild Hall, 6, Queen-square, W.C.1. 6.30 p.m.

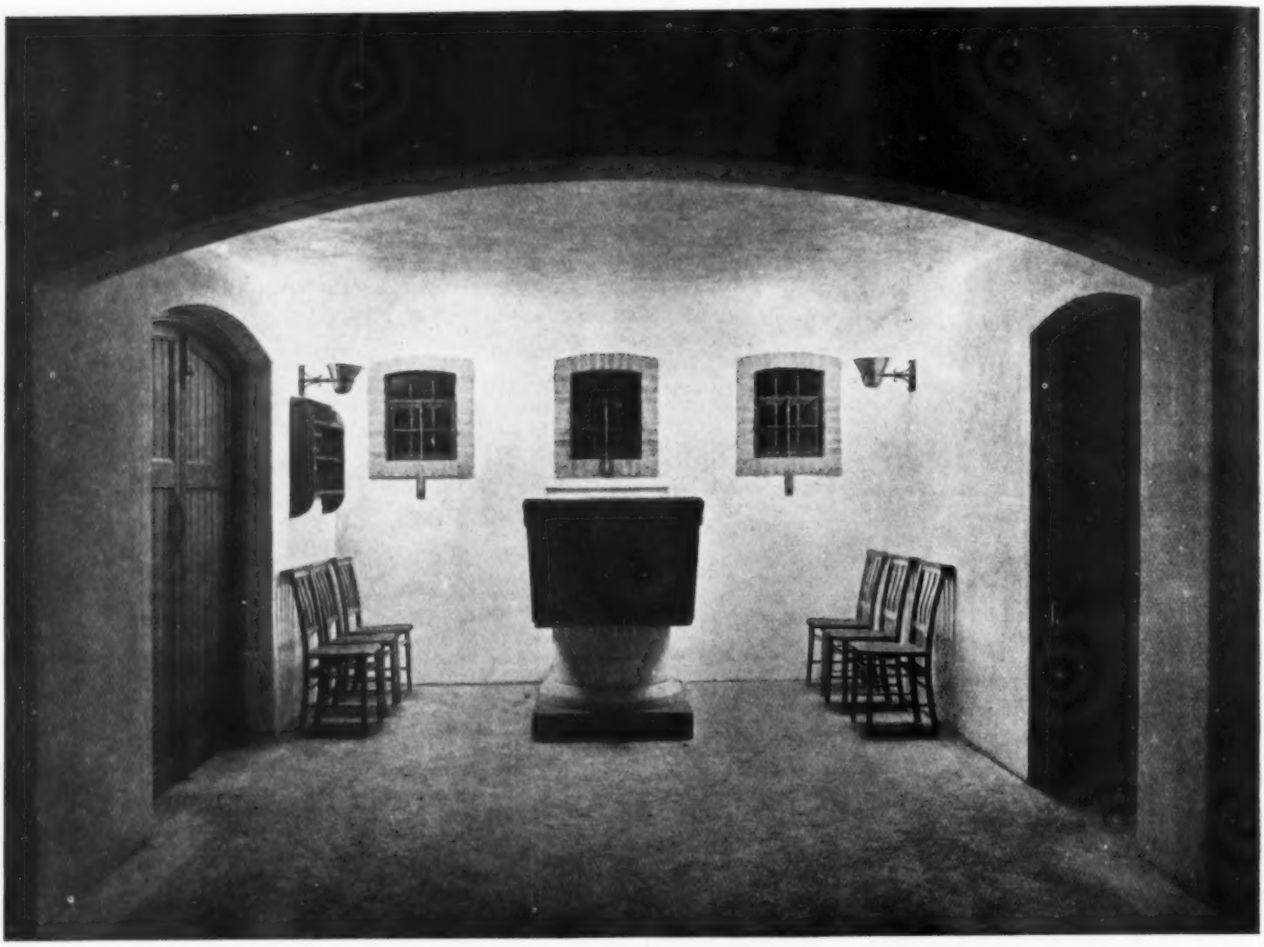


Miners' Welfare Institute, Ilkeston. MR. H. TATHAM SUDBURY, Architect.



St. Philip's Church, Rugby.

MR. H. B. CRESWELL, F.R.I.B.A., Architect.



BAPTISTRY

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St. Philip's Church, Rugby. MR. H. B. CRESWELL, F.R.I.B.A., Architect.

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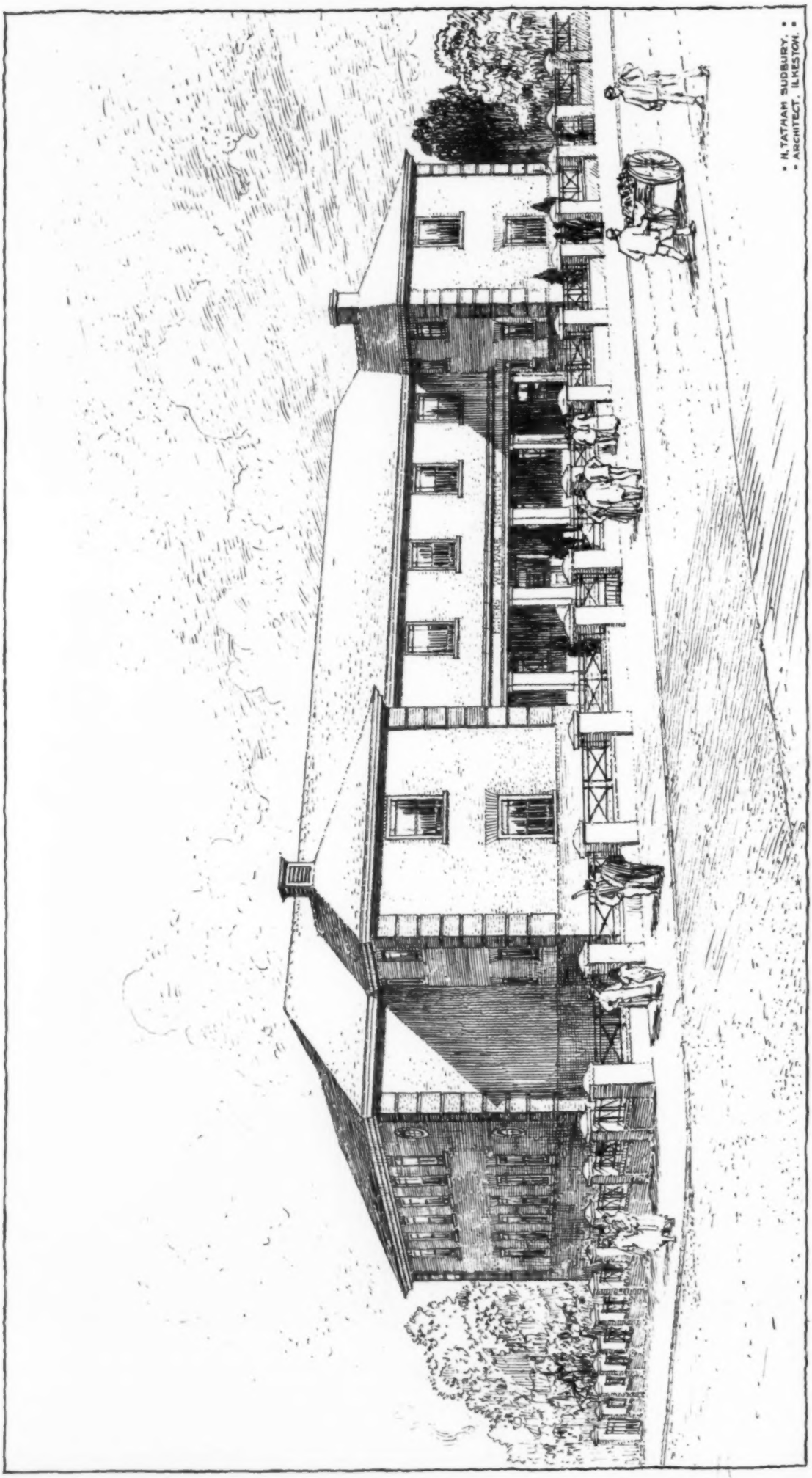
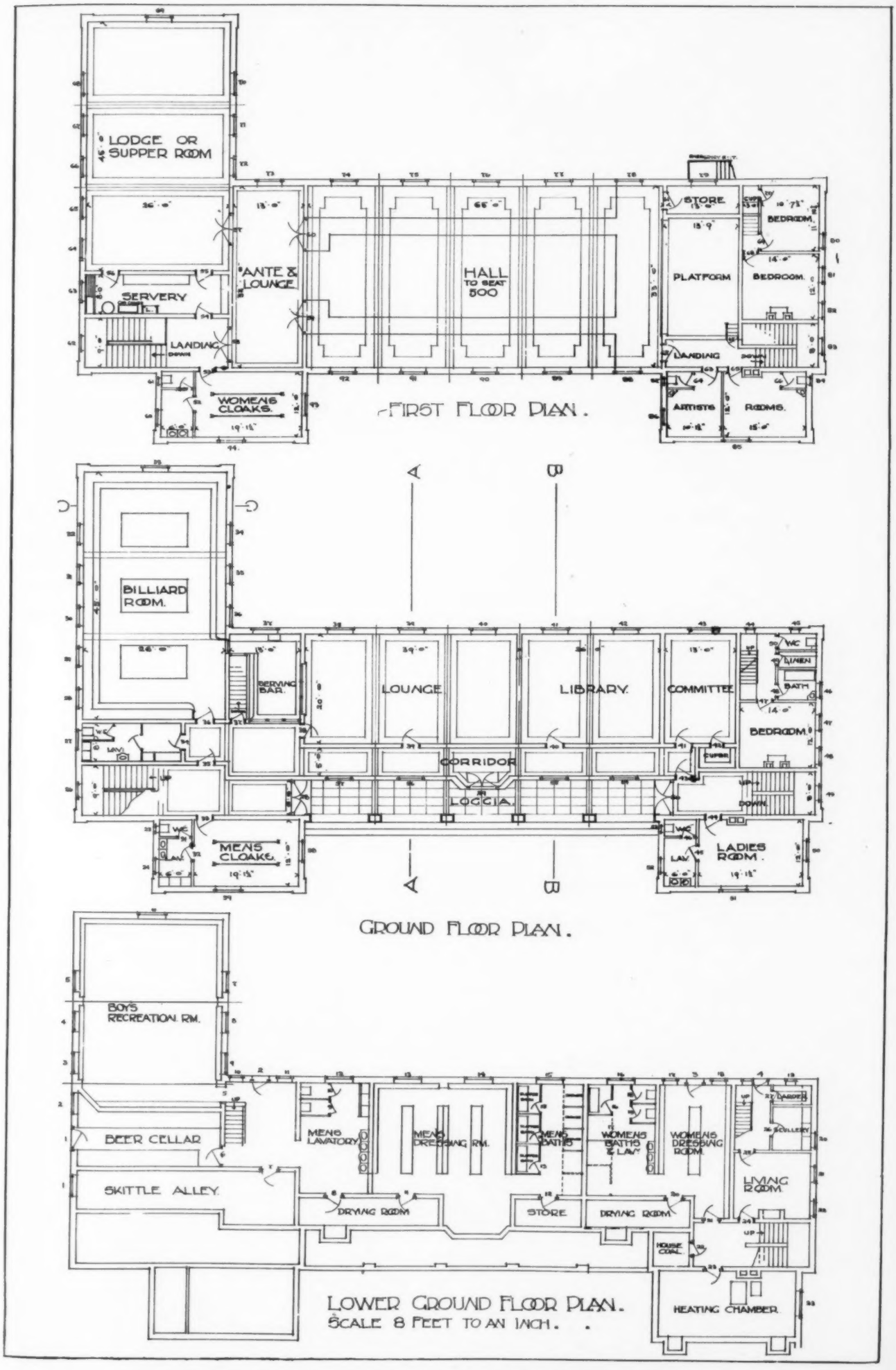
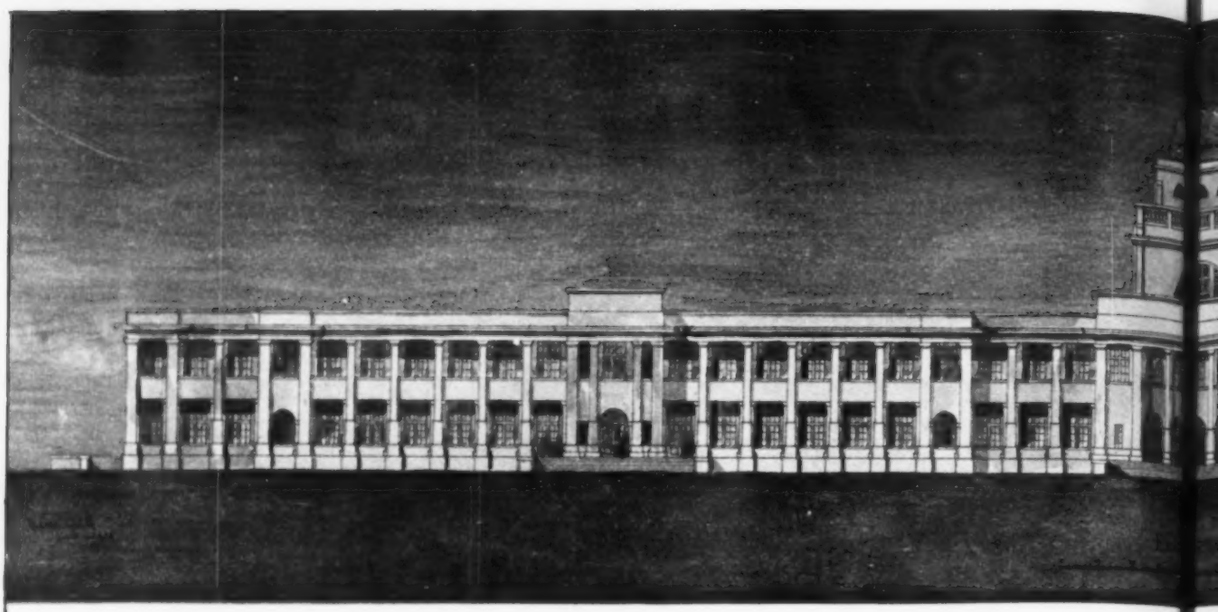
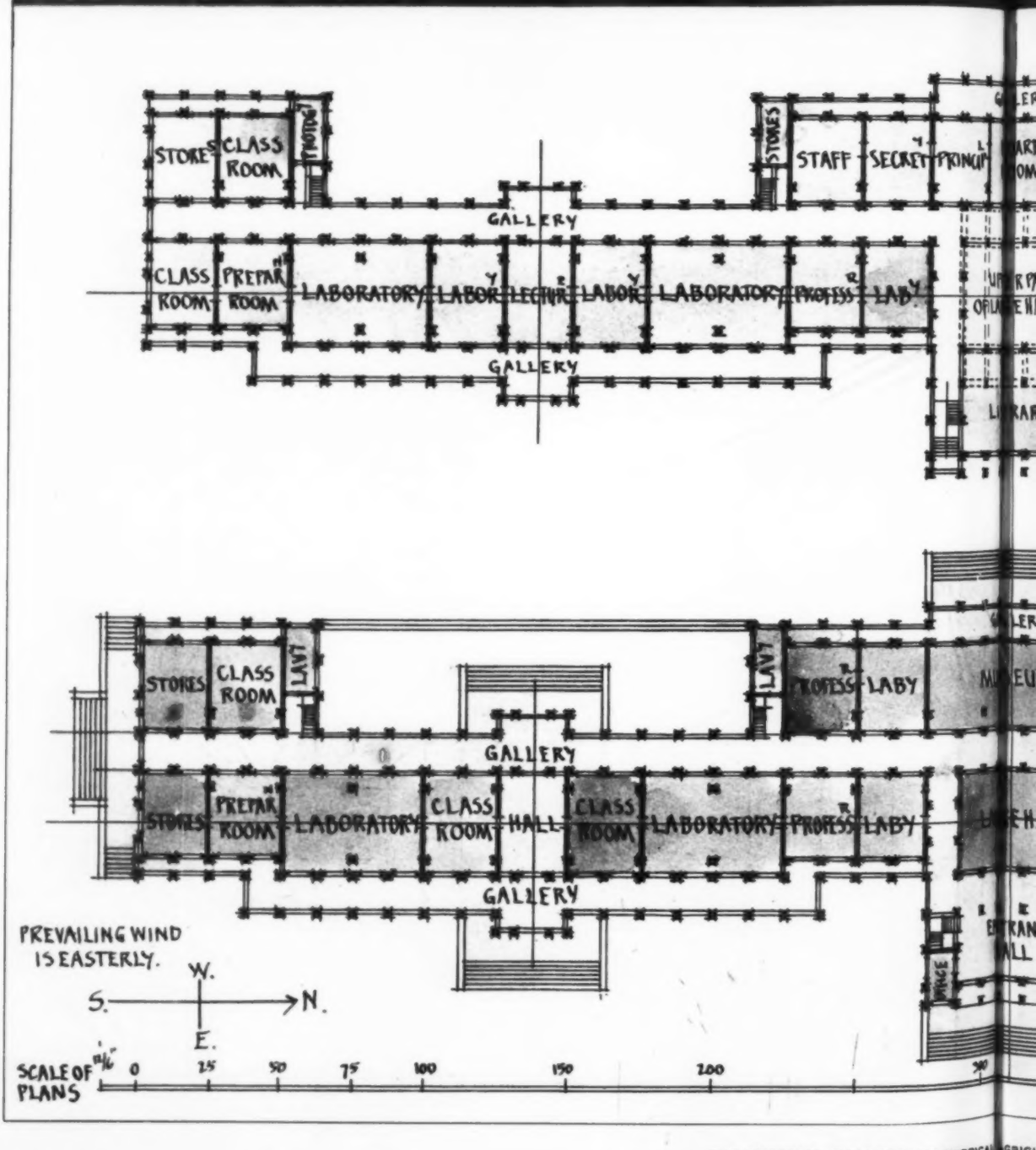


MINERS' WELFARE INSTITUTE, ILKESTON. MR. H. TATHAM SUDBURY, ARCHITECT.



MINERS' WELFARE INSTITUTE, ILKESTON. MR. H. TATHAM SUDBURY, ARCHITECT.

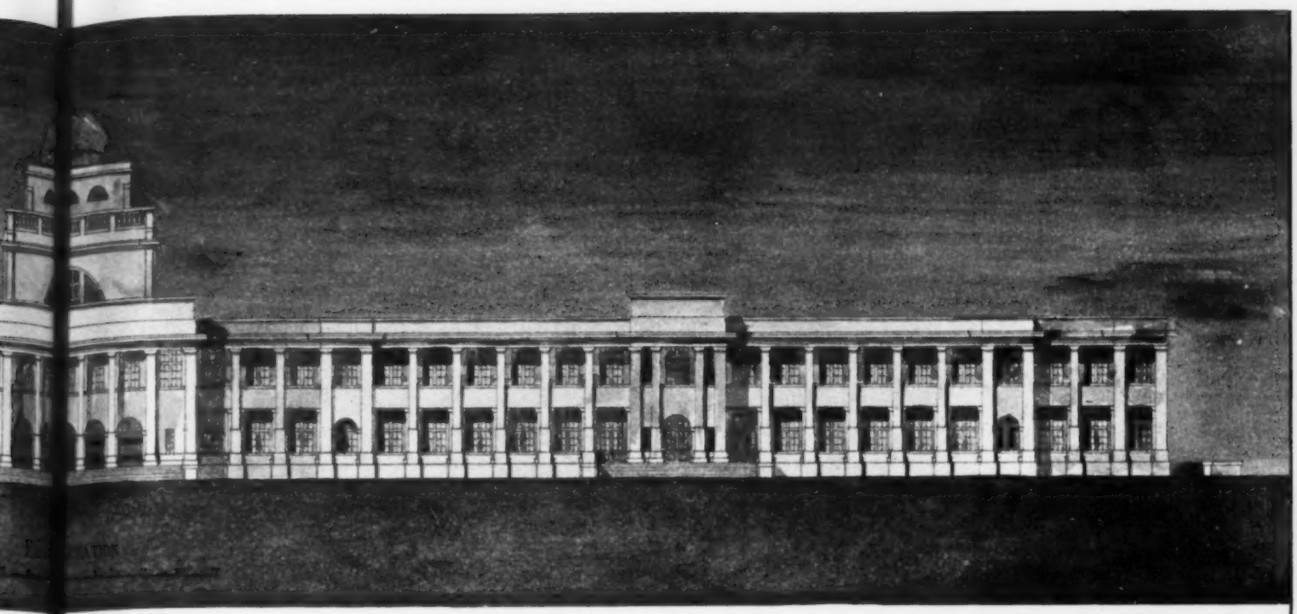


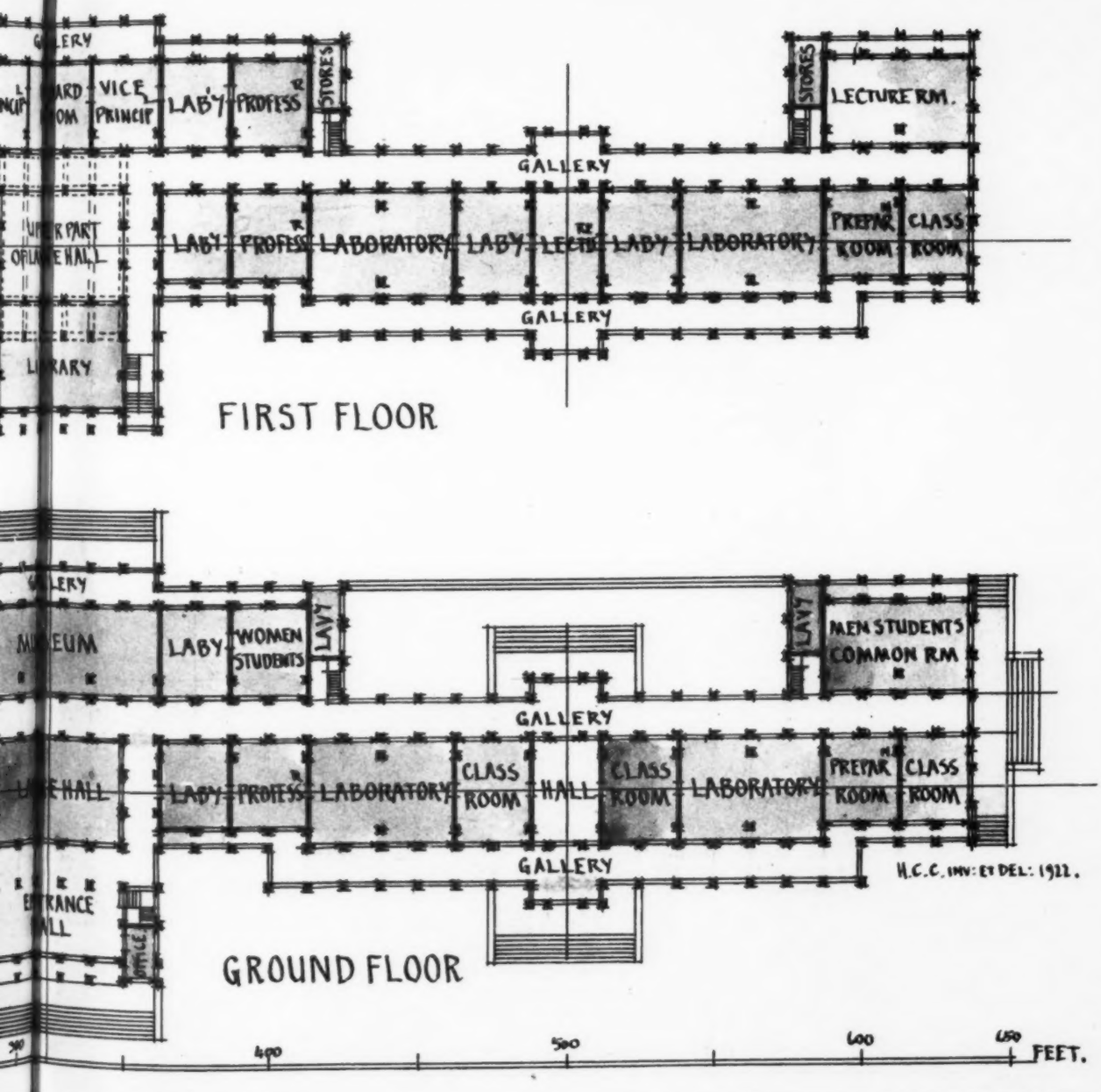


THE IMPERIAL COLLEGE OF TROPICAL AGRICU

MAJOR H. C. CORLETTE, O.B.E., F.S.A

THE ABOVE PLANS ARE EARLY SKETCHES FOR THE COMPLETE BUILDIN





OPICAL AGRICULTURE, ST. AUGUSTINE, TRINIDAD.

TE, O.B.E., F.S.A., F.R.I.B.A., ARCHITECT.

MPLETE BUILDING. THE NORTH WING REVISED IS NOW NEARLY COMPLETED.

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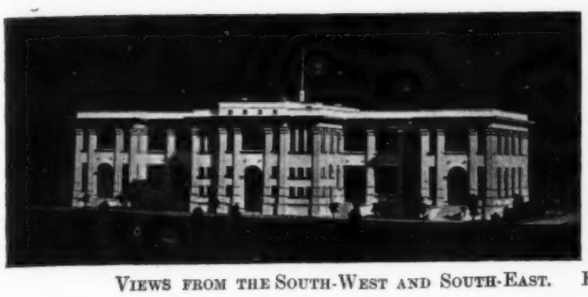
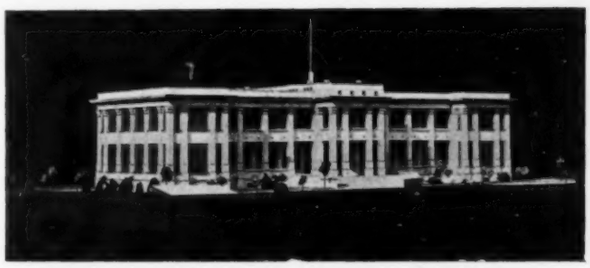
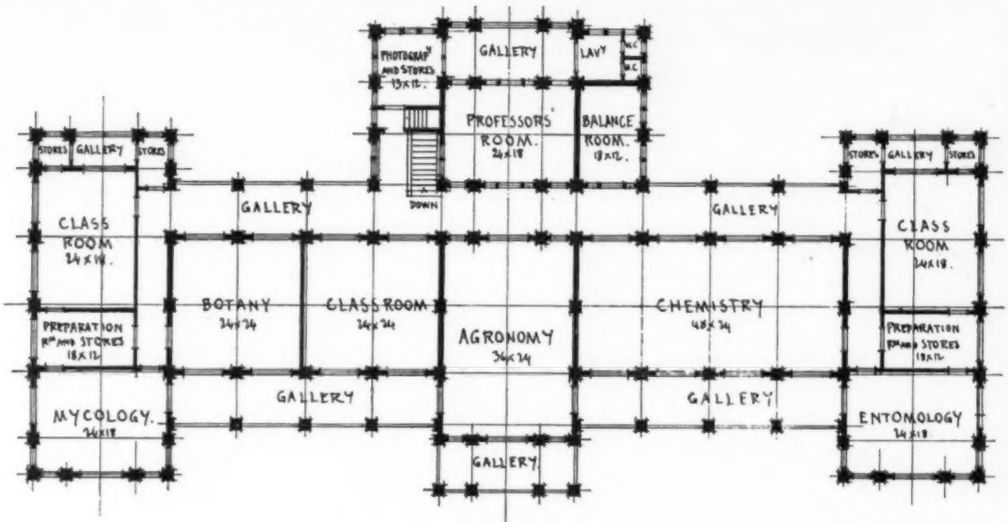
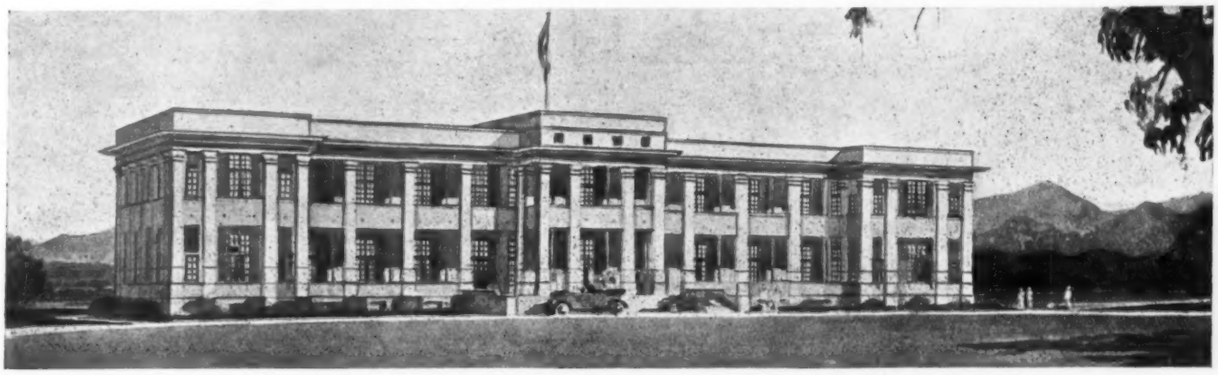


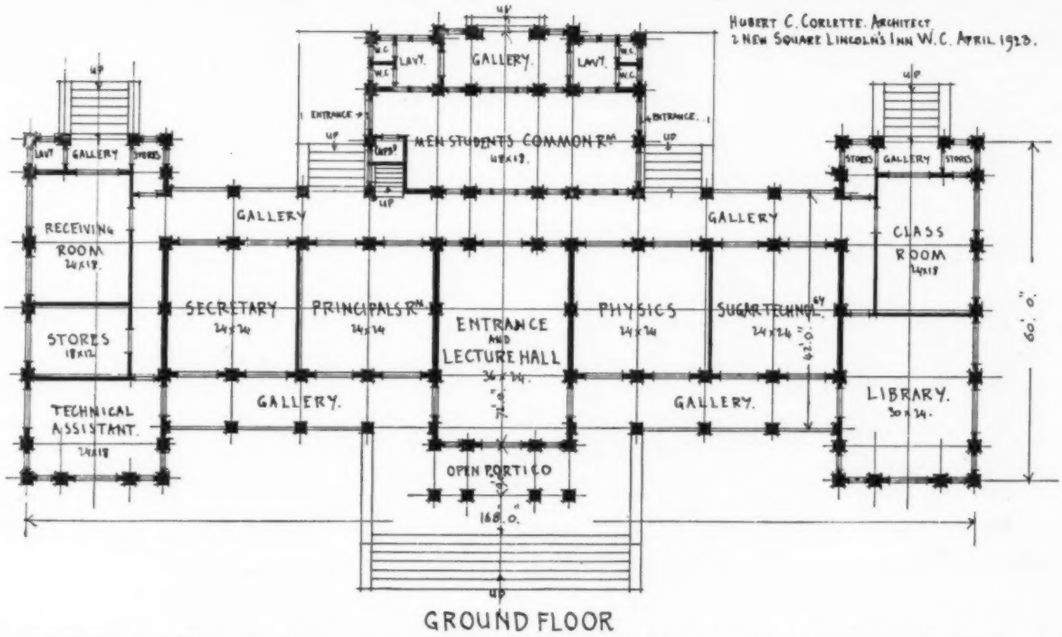


VIEWS FROM THE SOUTH-WEST AND SOUTH-EAST. FROM A MODEL SHOWN AT THE BRITISH EMPIRE EXHIBITION.



FIRST FLOOR





GROUND FLOOR

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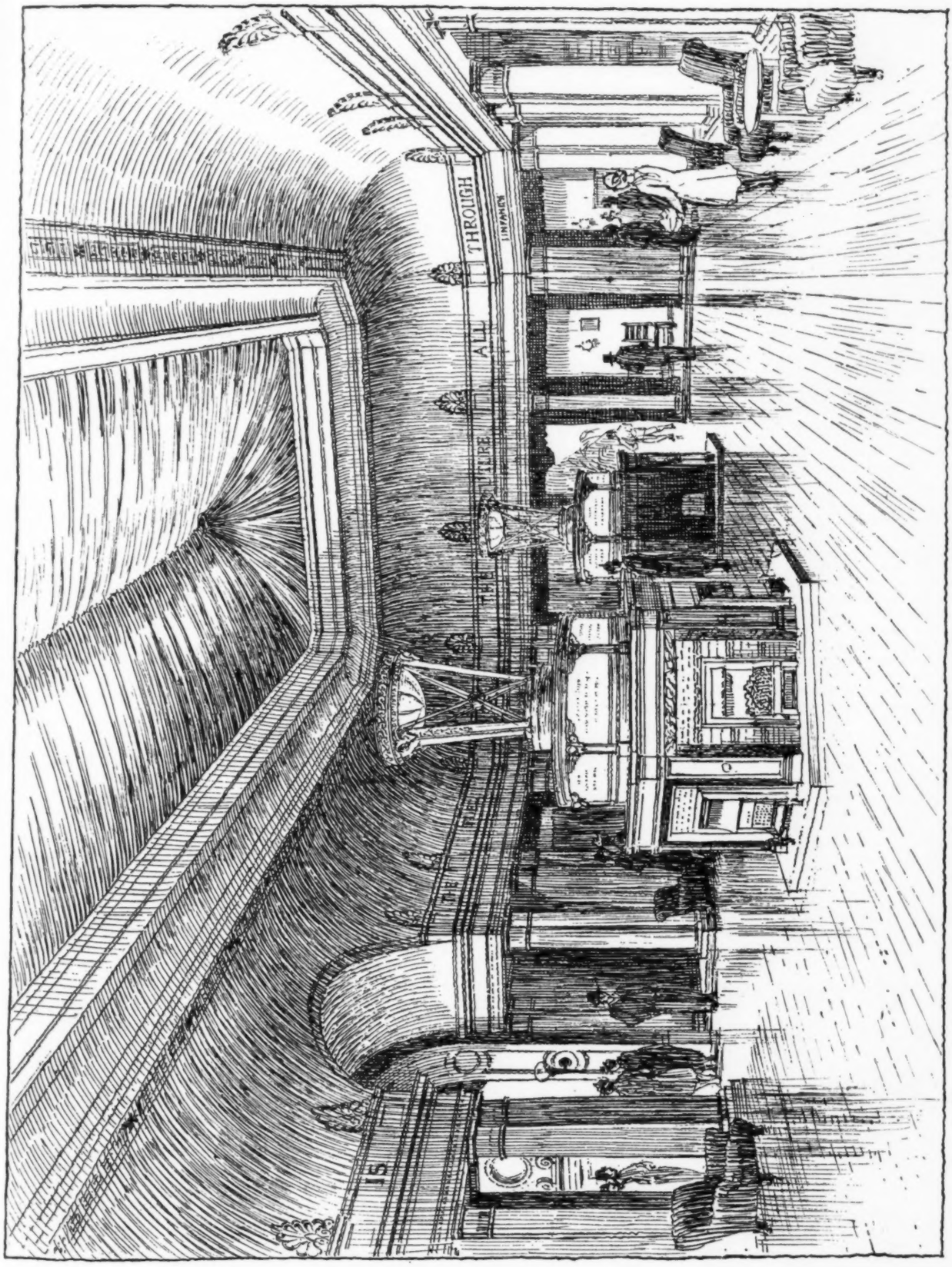


British Empire Exhibition: Gas Exhibit. (*See p. 564.*)

FIG. 6.—PORTION OF MAIN HALL AND LOUNGE, SHOWING PYLONS AND SOME OF THE MODEL ROOMS. MR. H. AUSTEN HALL, F.R.I.B.A., Architect.

WESTMINSTER ABBEY RE-EXAMINED—VIII

[*Continued from page 520*)

BY W. R. LETHABY.

FIRST AND SECOND WORKS OF HENRY III.

FIRST WORK EXTERIOR.

The north front has been separately discussed, but in examining the Chapter House we have seen that the influence of Amiens Cathedral is plainly evident there also, especially in the

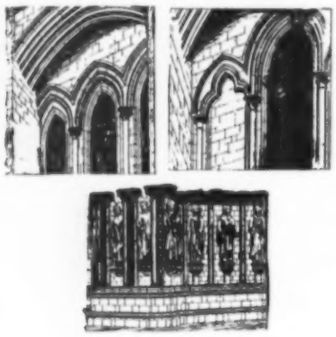


FIG. 7.—NORTH FRONT (S. Weatherley).

sculpture. If we could see the Westminster portals there is no doubt that we should find the Apostles on the jambs, directly imitated from those at Amiens, each with his significant emblem. Even in late reports of them they were recognised as Apostles. (Fig. 7 is from Mr. Weatherley's drawing of Sir G. Scott's proposed restoration.) We have a record of the mouldings of the great central doorway in a sketch by Carter, now at Westminster, Fig. 8 F. Scott followed the evidence in the main correctly from the decayed *original* work, but made some modifications. On comparing the "restoration" with Carter's sketch we can arrive at the original form. One of the arch orders had a great hollow for carved work, doubtless of little figures in interlacing foliage as at Lincoln, or of figures under canopies like the figures of Virtues and Vices of the Chapter House door at Salisbury —from the jointing Scott thought the latter. I gave an extract before from a letter of Mr. Baker King, who worked for Sir G. Scott, but print it here more fully as every morsel of evidence on these wonderful porches is valuable. "I have in my note book some sketches and dimensions giving the sizes of voussoirs of the arches which were carefully followed in the new work. Much of the old work, where it had partly perished, had been reworked in the eighteenth century. The orders of the arches

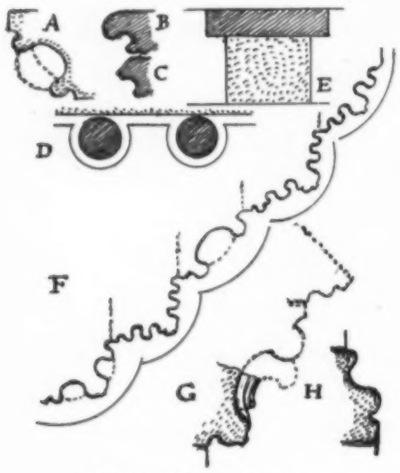


FIG. 8.—NORTH PORTAL.

which had had carving were reduced to this form (A, Fig. 8), the carving having been cut away. The Purbeck marble abaci of the caps, which had been something like this (B), were reduced to (C). The neckings of the capital also extended along the jamb splays thus (D) not dying against the splays. If you have been up to the stone roofs of the portals you will have seen that a considerable portion of the ancient stone slopes remains. The pitch of the gables was given by several of the stones which had the intersection of the two slopes. I do not think that any of the Purbeck marble shafts remain. The jointing of the corbels for sculptured figures inside the porches gave the dimension for these features, but all had been worked off flush [E, but part of one old corbel remains]. The sunk panels in the tympana of the inner arches had all been pared down" (September 2, 1907).

The "sunk panels in the tympana," just mentioned, must mean the series of cinquefoils in circles which form a series of medallions. That these had been reworked is confirmed by a sketch of Carter's which shows them thin and poor. I have no doubt that these circles originally contained little sculptures as at Amiens and that there is an echo of them in the doorway at Higham Ferrars.

Even the small details and the continuous base mouldings and neckings (Fig. 8, D) were taken from the portals at Amiens, and they are found again at Lincoln, which was derived from Westminster. Further, the record that the abacuses of the capitals only were of marble shows that the capitals themselves were carved, for all moulded capitals were wholly in marble. The late Mr. William Brindley informed me that fragments of the Purbeck marble shafts had been found and these were of a scarce reddish tint, as if they had been specially selected. Fig. 7 shows what Sir G. Scott thought the details of the windows above the porches would have been; the suggestions I made in 1906 agree entirely except that Scott rightly put carved capitals instead of moulded. In the actual "restoration" as carried out the forms which had come down to our time were altered. The remarkable gable tracery (Fig. 1) was destroyed 1884-90.

What may be called modern repairs in the church began in 1600. (See B.M. Add. 34195, f. 14 and 16.) Dean Andrews established a fabric repair fund. Hackett says of the next Dean, Williams, "he found the church in such decay that all who passed by shook their heads at the stones which dropped down from the pinnacles. Therefore he took care to strengthen it. He began at the south-east part, which looked the most deformed with decay, because of Henry VII's Chapel, which was tight and fresh; the north-west part also, which looks to the great Sanctuary, was far gone in dilapidations. The great buttresses, which were almost crumbled to dust with the injuries of the weather, he re-edified with durable materials and beautified with elegant statues (among whom Abbot Islip had a place) so that 4,500 pounds were expended in a trice upon the workmanship."

Norden, writing about 1600, says of the pinnacles of the buttresses that "many through antiquity have lost their form." Hollar's print shows the buttresses of the chapels without pinnacles, and the whole east end looking very bald.

The exterior of the ring of eastern chapels has been terribly pared down and put into a modern casing that it looks like a convict's garb compared with what its ancient, graceful beauty must have been.* However, it is better than anything we could now substitute for it. A photograph of the chevet of Reims Cathedral will help us to make an imaginary restoration. The chapels at Westminster still so distinctly echo those of Reims that we may be confident that parts which have been superseded also followed the great prototype (Fig. 6). At Reims the great pinnacles of the buttresses contain statues of a choir of angels in niches. The eastern buttresses at Westminster are utterly dry, drab and dreary, but those to the west of the transept have niches for statues which look as if they must have been derived from Reims, and in that case it would be through the buttresses of the first work.

Now in Hatton's *New View* (1708) it is remarked of the Nave: "It was on the outside adorned with the statues of princes who contributed to this building. They were placed in niches in the said 18 buttresses between the cross aisle and the west end of which not above eight remain on both sides." The transept end is then described, and the author adds: "There were also several figures on the buttresses on the east side of the church, which buttresses in the reparation thereof are rebuilt plain; but though that grand enemy of beauty Time has somewhat defaced her external features, yet there remains not a few marks of her outward gracefulness."

The windows of the apsidal chapels are obviously like those of Reims, and the buttresses are similar in having their lowest slopes in continuation of the window sills. The buttress slopes were in a smooth slanting plane at Reims, and this, as we shall see, seems to have been followed at Westminster. At Reims the outer window arches are studded with foliage, and this, I doubt not, was so also at the Abbey; we find such arch decoration inside the north transept doorways and elsewhere. The bare hollow mouldings of the chapel windows suggest such carving.

The exterior of one of the original windows of the apsidal chapels has been preserved in a sheltered recess at the S.E., next to Henry VII.'s Chapel, together with its six-foil rose. It has been shorn of its mouldings outside, but within even the carved ends of the cusps remain. This window is a treasure; it assures us what indeed is plain enough from the blank tracery within the chapels that the lower stage of windows in the first work really had these six-foiled roses. Remembering the insistence on rose decoration throughout the first work, we may not doubt that this tracery form was actually seen and understood as a rose. We shall find that exactly the same form on a very small scale was repeated in paint on the walls as a rose decoration. The jointing of the old window, which must have been one of the very first erected, looks a little uncertain and experimental. Some decayed pieces of carved ends of cusps remain among the collection of loose fragments.

The inner part of at least one of the triangular

FIG. 9.—FROM NORTH-EAST DOOR.

* In the books of accounts for work done in Wren's time, from 1698, the renewal of the external masonry can be followed in detail in items like this:—"Taking down 4 pyradmids" (pinnacles). "416 feet supl. of axing pointing and cleansing old Reigate ashlar at 4d. a foot." Wren last signed accounts 1721.

triforium windows still remains, except for the foiling; and the ancient ironwork of the foiled circles also, I believe, exists in several cases.

The clerestory windows of the first work have five-foiled circles and these are guaranteed in several cases by old ironwork. Some portions of what appears to have been the ancient cornice have been found (Fig. 8, G). Doubtless it was of the typical French fashion, a deep course with hollow moulding studded with carving, and a shallower drip course above. Evidence for this has been carried on in the series of renewals. H is the wall plinth, a French form.

One flyer of one of the ancient buttresses is preserved on the S.E. part of the clerestory, an

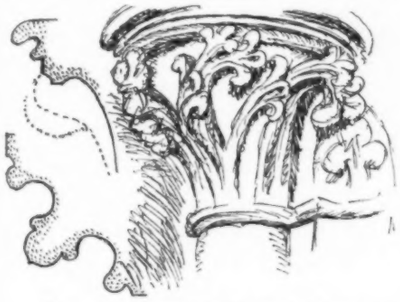


FIG. 10.—FROM SOUTH-EAST DOOR.

arch of two chamfered orders. The higher ends of the arches were supported by large capitals, and I was told many years ago that the ends of some of these, of Purbeck marble, had been found while recasing the apse. Fragments of the Purbeck shafts were also found in the walls.

The doorway entering Poets' corner, together with the walling about it, is the largest piece of ancient external work that remains. It is a companion to a similar door on the east side of the north transept, which is also largely ancient, although unhappily it went through the process of learned restoration, so that it is difficult to tell what is really old. Some of the carved caps—one of the French foliage type (Fig. 9)—remain, and enough of the carved arch to show that such carving existed. The Poets' Corner doorway has nearly lost its capitals by decay. My sketch (Fig. 10) from one of them is largely "made up" but it gives the style. These two external doorways with their original carved capitals are most precious. Together with the evidence as to the great portals given above

FIG. 12.—CAPITAL BY DOOR TO CLOISTER.

and the carved caps of the windows in the interior, they show that the door and window capitals of the first work were carved and not moulded

The south doorway into the east walk of the cloister decayed very rapidly until late years, when a coating of lime did some good. It has diapers of the Amiens fashion up the jambs with roses studding the moulding, rounds of foliage in the arch, and crowned heads as label terminations. The carved capitals were of the foliage crocket type. Some notes of these details are in Collings' sketches (1842) at South Kensington (E 4086), and earlier records by Carter carry us back to 1795. Fig. 11 was made in 1910. Fig. 12 is a capital near by, with one from the doorway also.

The vaults to the three northern bays of the east side of the cloister are the earliest built, and with their plastered cells and small bosses they are of an earlier type than others in the church.

The south transept as recased in Wren's time was restored into correct sham "Gothic" fashion in the upper part about 1870, and a new south rose was inserted about twenty years later. Some old photographs show the pleasant Elizabethan cappings to the turrets as still existing (Fig. 2). Repair of the lower part of the transept was undertaken about 1913. The casing —"flagging," as Wren called it—had become detached from the solid walls in big patches, but it was decided to repair the work as it was, making no vain attempts in sham Gothic. I have a note before me, dated July 5, 1916: "The repair of south transept has reached the buttress on the left of 'Wren's arch.' There were four weatherings to the buttress at the height of coping of cloister, the slope being continuous; the courses are 7 : 8 : 9 : 6 in.

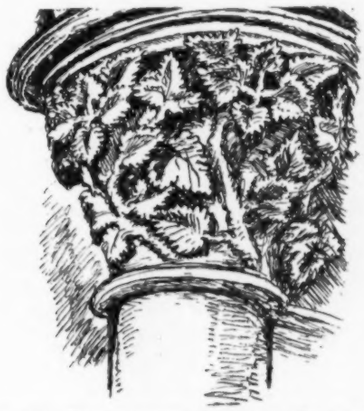


FIG. 13.—NATURALISTIC FOLIAGE (INTERIOR).

There was another slope of two courses at level of springing of Wren's arch and another near the level of triforium windows. Some 30 ft. in height of the buttress face, which was 5 ft. 8 in. wide, was exposed at one time. The work was very closely jointed in courses, varying from 6 to 11 in. The face of the slanting wall of stair turret also exposed; original face still remains in the recess under Wren's arch, which was built to carry the casing of the buttresses."

October 24, 1917: "Repair of south transept still going on notwithstanding everything! The splay angle of stair turret was exposed for a great height showing original, much decayed face. The courses are very narrow, some only five inches, and few more than eight inches. The joints white lime putty and very thin. The stair windows had probably been narrow slits originally. [A sketch of one in the turret by Poets' corner, by Carter, shows it six inches wide with a circular enlargement at bottom like a castle loop]. We have now seen a large amount of the original face of this transept." The facing

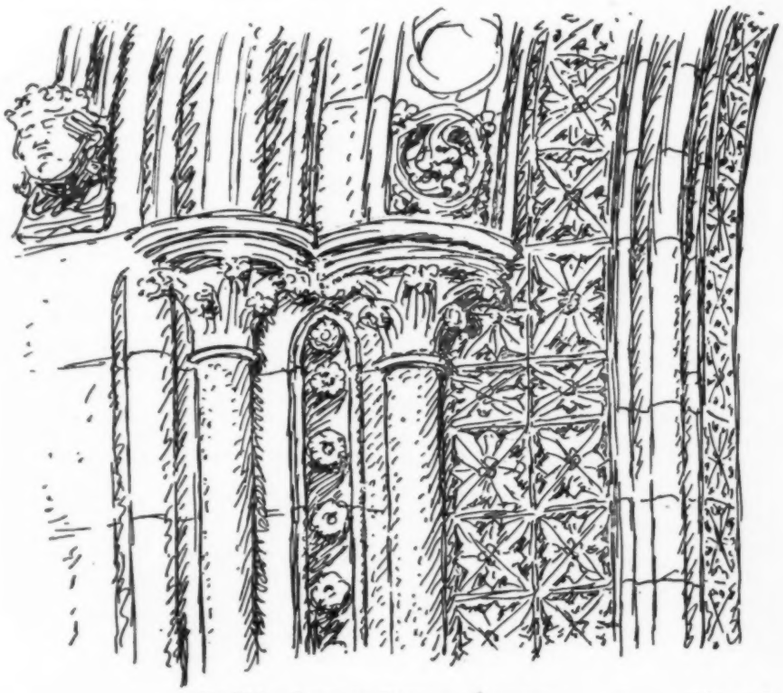


FIG. 11.—JAMB OF DOOR TO CLOISTER.

FIG. 14.—FALCON CAPITAL (INTERIOR).

courses of Chapter House and those which remain by Poets' Corner entrance are equally narrow. The stone was very white and the new building must have been bright and fair even before it received the usual protective coat of wash.

A lantern tower was designed as part of the first work and actually commenced. The squinch arches across the re-entering angles

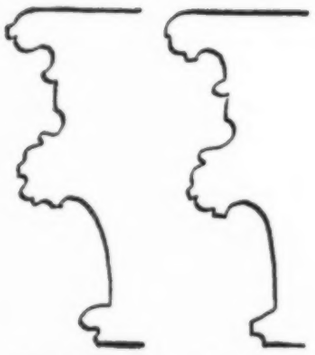


FIG. 15.—MOULDED CAPITALS.

of the cross represent old ones built to carry the parapet walks past the corners of the tower.

The ancient roof of the church still remains with some strengthening timbers added later. These do not appear in a drawing of the roof by Carter, dated 1777, and now at the Abbey. Each great rafter has long raking braces crossing in X form and a collar above. This roof was the work of Master Alexander the King's carpenter. Figs. 13, 14, and 15 are of internal capitals of the first work.

EXTERIOR: SECOND WORK.

About 1905 a considerable work of re-casing and re-editing "Wren's" restorations of the clerestory on the west of the north transept and of the choir adjoining was begun. On my first official visit I noted, December 12, 1906: "The clerestory of west side of transept is practically completed. First bay of north side of choir is stripped for recasing." (It was arranged that after the choir bays we should repair in detail continuing what existed without any attempt at making the details more sham correct.) "In this first bay traces of the blank arch to the right of the window has been found (the left was doubtless part of the first work, compare *Gleanings*), the face of the recess, weathered as it is, shows how very finely jointed the original masonry was. Mortar ¼ in. at most. (This blank arch was 2 ft. wide and no less than 9 ft. high and formed of an order 9 in. wide.) Original thirteenth-century squinch work at angles by lantern exposed." These were remnants of squinch arches which allowed the parapet walk to pass the angles of the lantern tower. "Original cornice was in two courses like 'Wren's.'" That is, it had a deep main course and a narrow dripping course over: only the backs of the stones remained. Some fragments which exist show a course about 12 in. deep with a big hollow having projections (carved ?) at intervals (Fig. 8, G).

In the second work there were many variations from the first, the blank arches just described

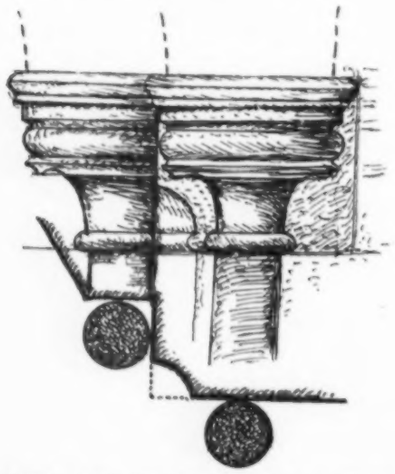


FIG. 16.—CAPS BETWEEN WINDOW AND BLIND ARCH.

were clearly not contemplated by the first master, for on the south side as on the north, the *eastern* jamb of the first window which belongs to the first work is plain. Such blank arches show a return to English fashions.

On the south side they exist with the aisle windows as well as in the clerestory; they do not occur on the north aisle because the buttresses are here of full width and there was no room for such flanking arches. These blank arches flanking the windows are very similar to examples at Fountains, Beverley and Lincoln. The last-named was doubtless copied with much else from Westminster itself, but the two others are earlier. As to the date of these, I consulted my friend, Mr. J. Bilson, who tells me: "There is no precise date known for the thirteenth-century choir and transept at Beverley—second quarter of century or c. 1225 to 1245. The new work had been dedicated before 1261. Beverley shows influence from Fountains." All this seems significant for the second work at Westminster was largely done under the mastership of Robert de Beverley, who fully succeeded John of Gloucester on his death in 1260–1. Robert was already working under the older master in 1259, and I have little doubt that he was already in charge at the Abbey when the aisle windows were reached.

In the work of repair a few months later one of the compound capitals, once under a window arch and on which a blank arch also fell, was found buried in the wall above the third clerestory window. This is of Purbeck marble *moulded*, and shows the type of detail of the second work (Fig. 16). The flying buttresses here had no marble shafts against the wall.

The triangular triforium windows of this part have three foiled circles instead of a single larger one. Essex, writing about 1780 (?), said: "The triangular windows at Westminster are of two sorts; all that are of this form (sketch with three circles) are the original, but the others having been renewed of late years are not of true form." (MS. Notes at B.M.) Essex was mistaken as to the entire alteration of the renewed windows to the eastern part, but the others when he wrote were still *original*. There is a drawing of one of them by Carter now at the Abbey, and they seem to have lasted on till 1835, when they and the aisle windows beneath were "restored" by Blore. The inner halves of some of these windows, except for the foiling, still remain.

The niches of the pinnacles of the buttresses appear in Wren's model of the church, and a sketch of them by Carter also exists; they must represent the original work with fair accuracy. The Cloister bays of this part are most elegant and share in the characteristics of the second work.

INTERIOR.—The setting out of the complicated plan is so exceptionally accurate that it is evident that the first work was begun as a whole on a cleared site. At the same time there are small variations of detail which show that the building was begun at the apsidal end. The bases of the apse pillars and those of the ambulatory are more delicate than elsewhere, some of them have hollows in their profiles and carved leafage filling the angles between the circular and octagonal forms. Apparently the work was pushed forward so rapidly that much had to give way before the King's haste. The arches first turned must have been those which have wood ties or rather props—the iron tie-bars were not ready in time. The diapering of spandrels of the main arches is smaller in greater part of the presbytery than at its north-west corner, and this earlier diaper is found on the east side of the south transept also.

In the second work the details of piers, wall-arcade, triforium, clerestory, and vault were modified, but so sympathetically that all is perfectly harmonious. The most marked variation is in the additional ribs of the high vault. A part of the changes had been intended from the first. Thus the first pillar west of the crossing although it is of the early work is different in plan from those to the east, but it has, like them, marble annulets, while those further west have them of bronze—an English fashion (Fig. 5). The vaulting shaft over the first pillar starts above a capital, while beyond it runs up from the floor without an intervening capital. The first bay of triforium here is also of the early pattern. In the second work all the windows and the cloister openings have five foiled roses.

This second work does not show the signs of haste which are so apparent in the first effort. The details, such as the cloister tracery and the wall-arcade of the aisle with its heraldic spandrels, are exquisite. Among the shields is that of Simon de Montfort, and as Micklethwaite observed, this would hardly have been chosen after 1264.

PLANNING.

The plan was closely conditioned by the then existing buildings and cloister. To the east was the Lady Chapel, old or rebuilt: connection with this may have been formed by a vestibule bay, or the chapel may have opened directly from the ambulatory as at Amiens. A portion of the actual work against the ambulatory still exists (Fig. 6). This is a plan taken at the level of the wall-passage of the chapels. I formerly thought that this wall passage terminated with the existing polygonal chapels on the north-east and the south-east, but on October 5, 1909, I got into a continuation eastward of the passage from the south-east chapel from A to B on the plan (Fig. 6). Beyond the point B the passage is blocked by the work of Henry VII's Chapel; what remains, however, is sufficient to show that there was a square bay here rather than a polygonal chapel. At the triforium stage it is evident that this space was floored at the level of the triforium which extends over the other chapels around the apse. There must either have been a transverse wall (Fig. 6, F) terminating this space to the east or an upper story at triforium level extended over the whole chapel. Perhaps the former is more probable. The surface of the wall passage still had its old whitening and rose decoration, and the marble shafts and bases still retained some polish. An outer base of the eastward continuation is on the level of the window bases and it falls on a sill similar to the window sills. There was certainly here a blank like a window light similar to those in other chapels; and doubtless it had a companion light to the east of it where not blocked by the buttress and the "blank" and the light would have made up a normal two-light composition. There was also an inner and lower base on the passage which ran east exactly similar to those under the shafts of the rere-arches of the windows. Further indications of moulded arches were found later under the leads which form the roof of the existing low vestibule between the church and Henry VII's Chapel. This part was exactly similar to the polygonal chapels, except that it was square. The two radiating buttresses next to this bay with their fliers above still exist (renewed).

The doorway in the south transept entering from the east was the immediate way of access from the Palace, and it must have been the King's private entry. It might be called the Palace door. Close against this door in the transept is another which opens to a spiral stair which ascends to a wall passage across the transept end, leading to a beautiful chamber which forms a gallery story intermediate between the ground floor and the triforium and occupying the space over three bays of the cloister. This chamber now known as the Muniment Room is open towards the church on two sides overlooking the altar and the choir, and I suggest that it was originally the royal pew. Such a position agrees with the tradition in palaces and castles of having gallery-pews in their chapels. This fine chamber, moreover, has specially beautiful sculptured bosses in the vault. There are also several carved royal heads among the elaborate decorations and also traces of painting on the window jambs. One of the capitals has hawks perched on the foliage (Fig. 14).

There was a second way of access from the cloister, and the series of radiating chapels

around the apse might be reached from the chamber or pew by the wall passage without descending to the ground floor. All this, I think, may have been specially contrived for the King.

The chamber was altered in the time of Richard II, when an immense white hart, the King's badge, was painted here over a wooden partition which was set up to divide the chamber into two parts.

Over the "crossing" of the church, as before mentioned, a lantern tower was to have been erected, and evidence of this intention is to be found within, as well as on the exterior. The great arches around the square space have label mouldings above them, and from the points where these intersect at the angles rose vaulting shafts, the bases of which remain—sure indications that the work was to have been carried higher.

The choir terminated to the west with a stone screen or pulpitum. There are in the

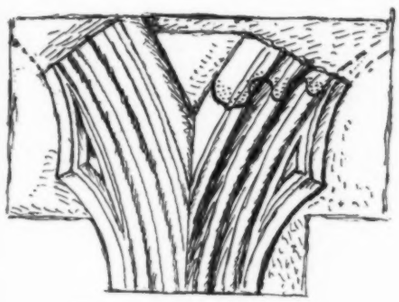


FIG. 17.—FROM PULPITUM ?

north triforium two fragments of trefoil blank arches, much like the wall-arcade but different from it. I have wondered whether these did not form part of the western front of the pulpitum, date *c.* 1270 (Fig. 17). Organs are mentioned from an early time. Parts of the original marble pavement, consisting of squares laid diagonally between longitudinal strips laid square, may still be found in the ambulatory, transepts and aisles. Several years ago, in

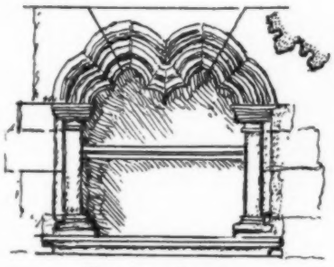


FIG. 18.—PISCINA.

repairing a part of the wall on the east side of the north transept, the remains of a piscina were found behind a wall tablet. Of this Fig. 18 is a rough restored sketch.

English Church at Ypres.

An appeal was recently made by Field-Marshal Earl Ypres for an English church to be built at Ypres. This suggestion was followed up at once and strongly commended by the Archbishop of Canterbury and other representatives of the Church of England and the Army, in a letter to the Press of August 7. The chairman of the Ypres League now informs us that their idea is to build first the chancel end of the church and then extend it, if necessary, to hold about two hundred people. They have been deputed to make the appeal for funds to carry out this work, and they ask that subscriptions should be sent to either Bishop Bury, c.o. the Rev. B. Staunton Batty, Commissary, Christ Church Vicarage, Down-street, London, W.1; or to Field-Marshal Lord Plumer, through Lieut.-Colonel Poole, 36, Eaton-place, London, S.W.1.

A GERMAN INNOVATOR

ONE feels that much of the work of the ultra-modern school must be judged not so much from actual performance as from the promise which it may hold out. Otherwise judgment on such work may be unduly harsh, and ideas stifled in their genesis, merely because their preliminary manifestations are tentative and crude.

The buildings and designs of Erich Mendelsohn* cannot be seriously regarded as fully developed expressions of the steel and concrete industrial architecture, the dynamic idea translated into form. They appear too crude for comparison with the finished product of any classic, romantic, or crafts school of design. They will command interest and respect only if they stand the acid test of fitness for the practical problems which they arise to serve, and of this fitness plans and photographs do not permit a considered judgment. As essays in pure form, as straightforward expressions of material and structural design, they appear to be a failure at the best: sincere but tentative effort; at the worst, tortured and bizarre attempts at architectural notoriety.

One may dismiss this latter hypothesis on the basis of our information regarding Mendelsohn: his dreams during the war of a better and finer foundation for a living architecture, his hopes, born in the trenches, of a genuine expression for the industrial post-war era. He was so sensitive as to visualise the post-war problem and evidently prepared to meet it by an architectural formula compounded of the artist and the engineer.

As an introduction to his book we find reflections and lectures obscure as are the most involved of German philosophic writings. Here, again, we cannot judge. Either Mendelsohn is often writing untranslatable nonsense, or else he has been cruelly ill served by his translator; for many of his sentences, words and arguments, are not only un-English, but incomprehensible.

The chief value of this publication of Mendelsohn's designs lies in the stimulus which they supply to others to attempt fresh and logical architectural expressions; in the sometimes successful massing of his buildings (*vide* the "New Hat Factory"), and in the plastic handling of form in concrete construction as exemplified in the Einstein Tower. In addition, there is interest in the actual technique of the sketches and working drawings. Judged from the standard of production, the book is in every way admirable; but should there be a further edition we hope that the obscurity of the present text will be remedied.

MYTHS OF CHINA AND JAPAN†

IT is a fairly safe thing to say that, apart from the mere trade stuff turned out for the European markets, the Chinese potter never made and decorated a pot that had not an inner meaning—perhaps twenty meanings. A prunus jar is something more than "just a piece of blue and white"—a rather unconvincing sketch of plum blossom reserved in white on a blue ground of cross hatchings. Whatever else in addition it may mean, it certainly is an epitome of spring and the ever-recurring miracle of the rebirth of Nature. It is told in two words—the first flower of the spring, and the breaking up of winter's ice. The plum tree, we are told, is closely connected with the dragon, inasmuch as a dragon was once punished by having its ears cut off and where the blood dropped to the ground the plum tree sprang to life. The dragon is a gentle beast in China, and never went in fear of our St. George. He is the water-giver—no dragon, and there would be no spring rain after the winter drought. He was not always a dragon, but a strange mixture of several animals. He himself, as the water-giver, is the prince of all the lucky things in the Chinese imagination, and associated with him is the priceless pearl—which is, perhaps, the moon—and so chasing or clasping the pearl is he depicted by the Chinese artist when he puts his hand to paper or porcelain.

We have merely hinted at one or two of the many things which the reader will find in the closely-packed four hundred pages of Mr. Mackenzie's book, and we can only commend in passing the thirty-four plates illustrating and illuminating the text. The aim of the writer is not merely to interest us in the myths of China and Japan as myths, but to help us to understand something of two great nations and ancient civilisations through a knowledge of their religious beliefs and ancient folk lore. Judging by the footnotes referring to authorities on almost every page, we can well believe that the author has left no stone unturned in tracing the origin of the myths. He shows us quite clearly how China received her civilisation from the Byzantine Empire—to state the case quite baldly and inadequately—and how the same influences that penetrated to the Far East drifted as far west as the Scottish Hebrides and, to quote from his preface, "When, however, it is found that China obtained certain myths and practices from the area called by its writers 'Fu-lin' (the Byzantine Empire), and that not only Byzantine but Ægean influences are traceable in the Celtic field, the charm-link between Gaelic Scotland and China may not, after all, be regarded as 'far-fetched.'"

The book should prove a useful and welcome adjunct to the many volumes on Oriental art now pouring from the press. The mere lover of legend and folk lore will be gripped from start to finish, and the art student or collector of pottery, prints and rugs will find it of inestimable value. He will learn something of the inner meaning of the innumerable "precious things," animate and inanimate, which go to make up the sum total of Oriental aspirations—long life and good luck.

* "Erich Mendelsohn, Structures and Sketches." (Ernest Benn, Ltd.) Price 21s.

† "Myths of China and Japan." By Donald A. Mackenzie. (The Gresham Publishing Co., Ltd.) Price 12s. 6d.

WAGES ON PUBLIC WORKS

THE Public Works Conciliation Board has made an award, dated September 30, 1924, for the London Area, namely, the City and County of London and the whole of the districts of all the local authorities the whole or any part of whose district lies within the Metropolitan Police district. The award fixes the rates of wages to be effective for the three months, October, November and December, 1924, as follows:—Blacksmith, X plus 4½d., 1s. 8d.; concrete leveller, X, 1s. 3½d.; duct or earthenware drain layer, X plus 1d., 1s. 4½d.; fitter, X plus 4½d., 1s. 8d.; granite mason kerb, &c., X plus 5½d., 1s. 9d.; granite sett dresser, X plus 4½d., 1s. 8d.; jointer, X plus 1d., 1s. 4½d.; kerb fixer, X plus 4½d., 1s. 8d.; pavior, X plus 4½d., 1s. 8d.; petrol locomotive, petrol roller, or petrol air compressor plant driver, X plus 2d., 1s. 5½d.; pipe jointer (iron up to 6 in.), earthenware or concrete pipes and conduits, X plus 1d., 1s. 4½d.; pipe-jointer (iron) above 6 in. diameter, X plus 2d., 1s. 5½d.; platelayer, X plus 1d. to 2d., 1s. 4½d. to 1s. 5½d.; platelayer labourer, X, 1s. 3½d.; pneumatic pick operator, X plus 1d., 1s. 4½d.; rammerman, X plus 1d., 1s. 4½d.; scaffolder, X plus 3d., 1s. 6½d.; screeder, X plus 1d., 1s. 4½d.; steam roller driver, X plus 4d., 1s. 7½d.; street mason and flag dresser, X plus 4½d., 1s. 8d.; tarpot man, X, 1s. 3½d.; timberman, X plus 1d., 1s. 4½d.; wood block layer, X plus 1d., 1s. 4½d.; man working in "Boots," 1d. per hour extra; watchman, 7s. 6d. per shift minimum day or night. The hours of labour and overtime rates to remain as agreed on March 11th, 1920. "X" = labourers rate, 1/3½d.

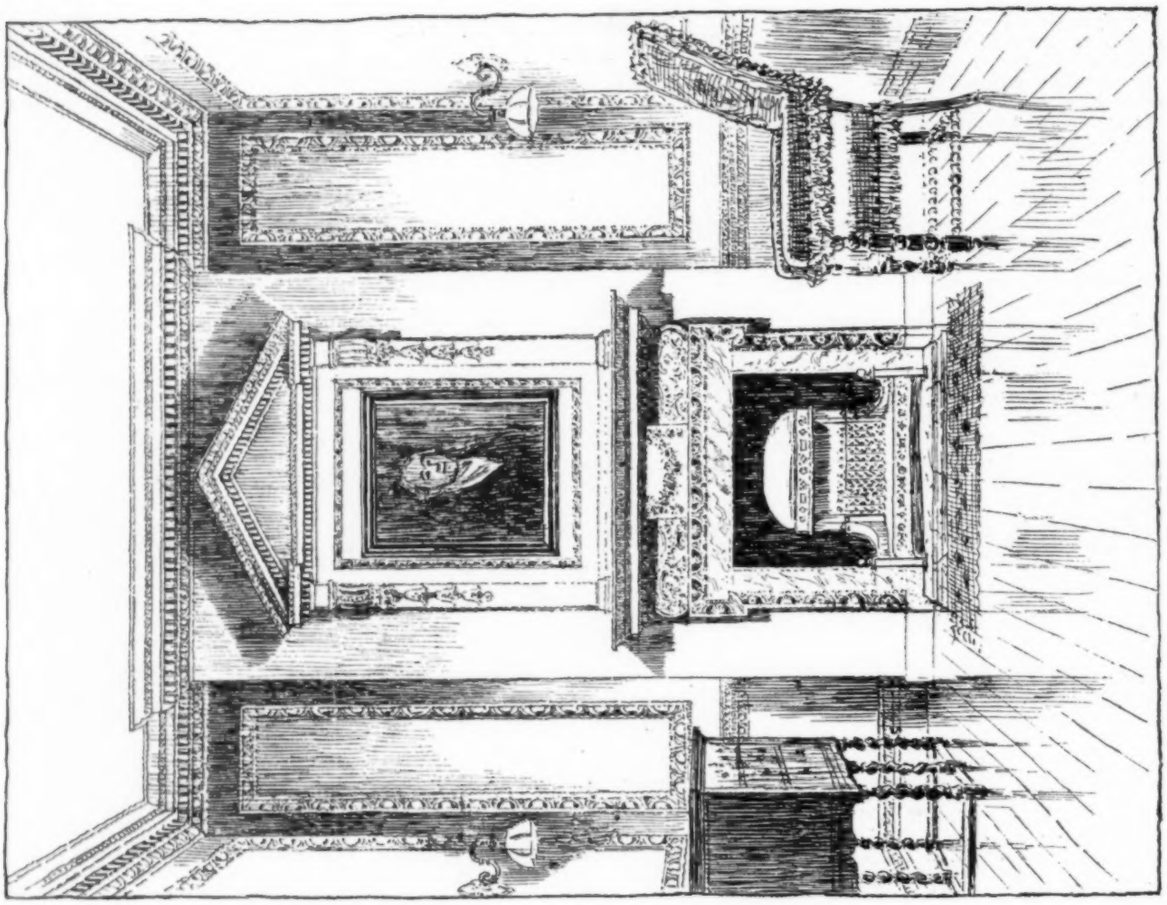


FIG. 3.—DOCTOR'S CONSULTING ROOM.

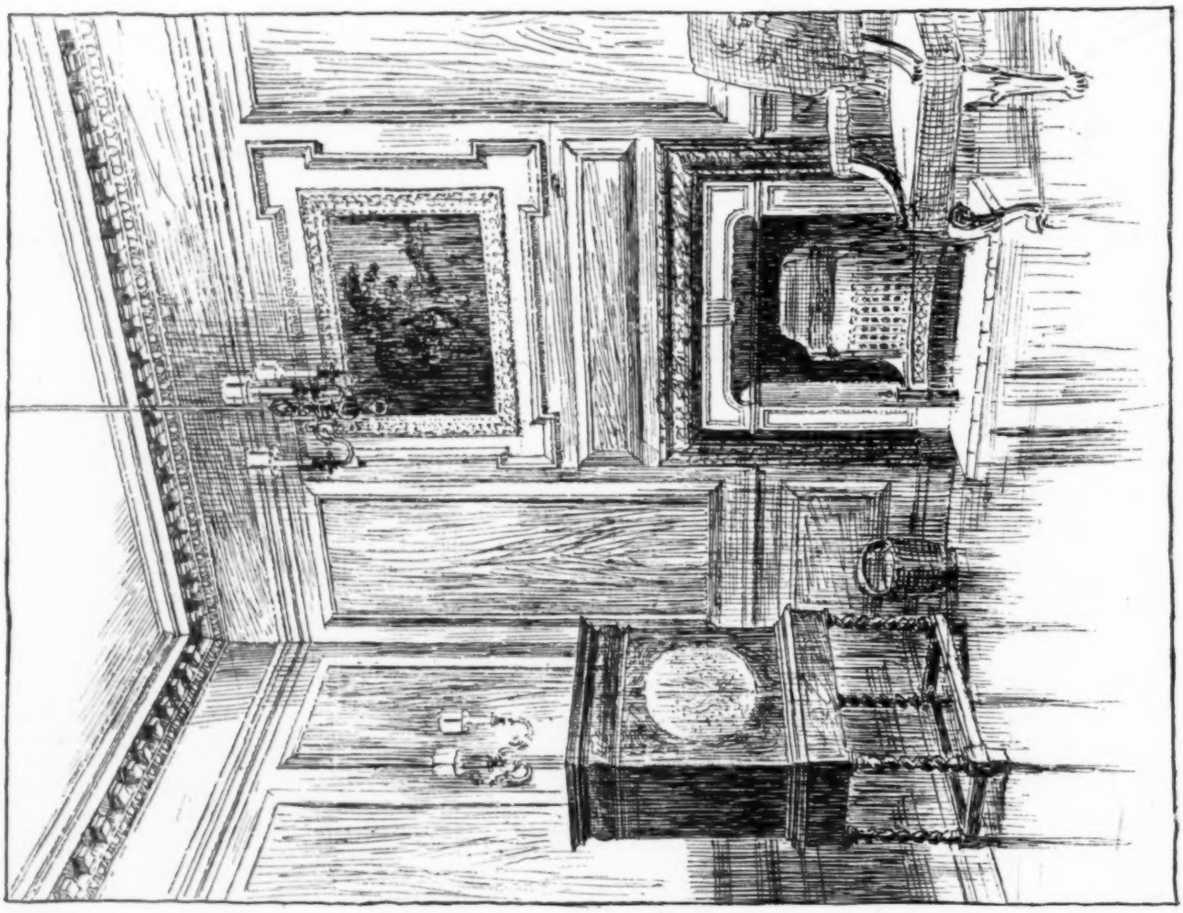


FIG. 4.—BUSINESS ROOM.

British Empire Exhibition: Gas Exhibit. MR. H. AUSTEN HALL, F.R.I.B.A., Architect. (*See p. 564.*)

HEATING AND VENTILATION

FRESH AIR AND WARMTH

THE privileges that have followed upon civilisation have been truly bought at a price, and in some respects we have undoubtedly become very inferior creatures in the process.

The same power that gave us the ingenuity to build houses and design clothes, has certainly stripped us of a great deal of that natural resistance to the elements which the remainder of the animal kingdom possesses. Whether the heating engineer and the tailor came to the aid of the ape grown bald, or whether their premature efforts precipitated the affliction, are conjectures as little important as the vexed question of the priority of the egg and the chicken. What concerns us to-day is rather that there exist certain frailties in the human constitution that must be met in the best and most scientific ways if we are to bear an efficient part in the civilised world of to-day.

Artificial heating is perhaps one of the most important of these means of living and very closely allied to it is the question of ventilation—in fact, the one is almost the natural corollary of the other. The ancient fire on a hearth in the centre of the hall floor, and its stifling effect, introduced the first germ of ventilation, though it took but the form of a hole in the roof. It was but a small step to the introduction of the smoke flue, and yet this advance has sufficed for its purpose through many centuries, and even to-day more than holds its own in the class of domestic work that concerns the vast majority.

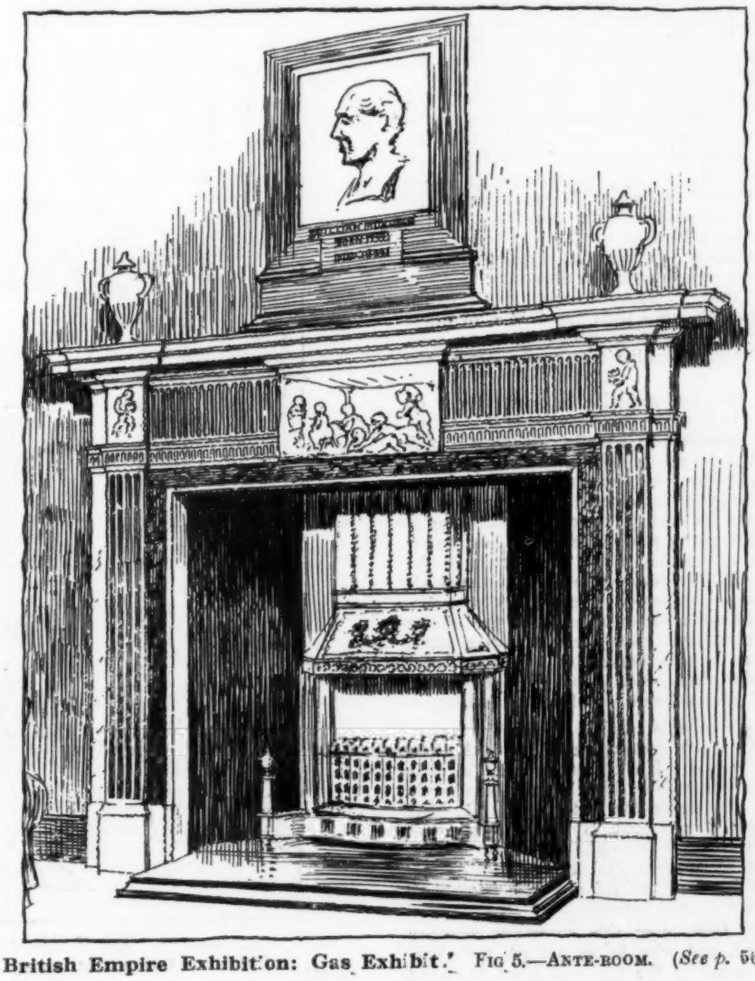
The smoke flue does indeed serve a more useful purpose than that for which it was originally designed, for the strong upward current promoted by the rarefied heated air and smoke, makes a fairly efficient exhaust whereby a stagnant atmosphere is avoided and frequent renewal ensured. The real objection to reliance upon the smoke flue for ventilation lies in the fact that what efficiency it has is largely accidental, and as such it naturally does not perform this function in its most direct and efficient manner. It operates from a point where the air is at its purest, and rapidly extracts it before it has borne its fair share in the relief of the overburdened atmosphere of the room. The fire itself is also a most imperfect source of heat. Of the three methods of transmission of heat—convection, conduction, and radiation—little more than the latter is called into play, while a vast bulk of heat is sucked rapaciously up the chimney to waste itself in the open. It does indeed seem extraordinary that we should tolerate such a state of affairs, and yet as we write and read the words, we know full well that we love the coal fire with all its faults. It does indeed stand as a symbol of comfort to which the heart at once responds, and we shall most probably have to put up with it for long to come. Such advances as we now make are more in the direction of supplementing the function of the fire and correcting many of its faults.

We need not dwell upon the more ambitious and elaborate systems by which our large halls and theatres and underground stations are maintained with a comfortable temperature and a healthy atmosphere, and there is much to be proud of in many of the achievements of the age in this direction. For most of us, the treatment of the domestic house is of greater and closer concern.

Central heating implies a first cost which our difficult times may sometimes distort into an appearance of the impossible, but we should do well to resist the impulse to be appalled and compare the incessant outpourings of waste energy in the household with their sum capital value, to get a true perspective of the real relation between the two. Consider the duplicate fires that have to be cleaned out, stoked, supplied with a full scuttle from some remote place; the range kept alight during all hours of a non-cooking day; perhaps the sick room fire upstairs. Think of the frenzied airing of bedding in the damp spare room on the arrival of the unexpected guest; the continual repolishing of furniture that would keep a surface in a reasonably dry atmosphere. And, do not let us forget the lost days in bed recovering from the cold caught on the chilly staircase after the stuffy room. Surely even these chance shots would seem to indicate that we are seriously reducing our income when we struggle to save this moderate sum, that fades into a fraction when spread over the number of years that would be served. Then there is the great opportunity that such a system affords towards an improved system of ventilation. Take the case of the ventilated radiator. The air drawn in and warmed on its way, passes naturally up into the vitiated upper strata. There is little or no loss of energy and the inlet of fresh air is not left to the inefficient joiner to supply by way of ill-fitting doors and windows.

How far the design of some of the radiators with which we are familiar has adversely influenced the wider use of central heating with all its advantages, is difficult to say. The test of beauty is, however, far more incisive than we are apt to imagine, and may often give the definite lead towards the solution of many a knotty problem by way of the sensibilities, after the unaided intellect has given up the task in despair. It is in such instances as this that the architect with his broader outlook may with advantage influence the specialist. With a perfectly legitimate function to perform, it must be as fit for a beautiful expression as is the fireplace. We must, therefore, welcome with enthusiasm the beautiful models which have been designed comparatively recently. Their graceful and slender lines can give an added beauty to the finest room, as a piece of well-designed furniture, and the expensive grilles and casings wherewith we were wont to cover the abomination, with disastrous results to the circulation, can now be dispensed with. This must be reflected in an impetus towards the more general use of central heating in this country.

Time will show if this is to be so, or whether the traditions of an old country are ever to stand in the path of progress. Let no prophet risk his reputation upon the fate of the open fire, which appears to be a part and parcel of our home life. It is no doubt very stubborn and stupid of us, but we shall be forgiven if the same trait appears in other directions in the form of that spirit of firm determination that has carried the country through so many dark places. It is well to exercise the quality in maintaining an interest in many of the duller sides of building study, which can always absorb the attention of the mind that recognises that the inspiring whole of building achievement is only to be built up of practical component parts none of which can be neglected if the whole is to be completed and realised.



British Empire Exhibition: Gas Exhibit. FIG. 5.—ANTE-ROOM. (*See p.* 564.)

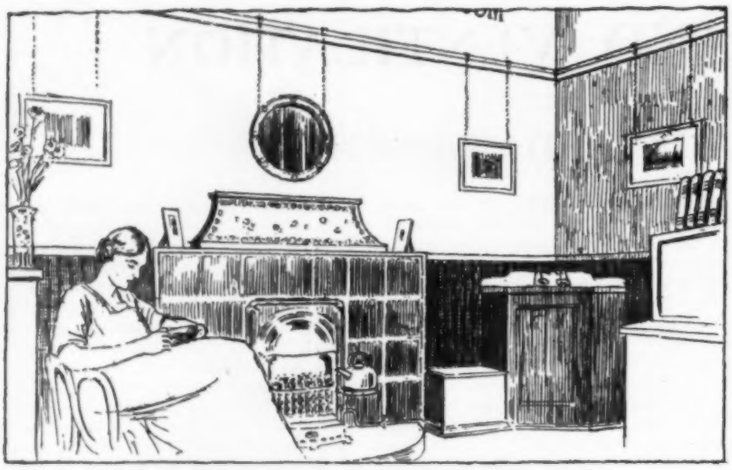


Fig. 1. STUDENT'S BED-SITTING ROOM. (*See p.* 564.)
British Empire Exhibition: Gas Exhibit.

CHEAP HEATING: WARMTH WITHOUT WASTE

BY MANNING ROBERTSON, A.R.I.B.A.

WE are often told that heating by hot air is unhealthy, that the radiant heat of the open fire is "Nature's way," and that the heat derived from radiators or hot stoves leads to stuffiness, sore throats, and ill health. But those who admire Nature's way overlook the methods adopted by Nature to prevent our winter climate from being as cold as that of central Canada or Siberia. We all know how much we (sometimes) owe to the radiant heat from the sun in summer, but why is not the winter, when the sun is virtually absent, not far colder than it is? Other countries on the same latitude suffer from a mean January temperature 70 degrees and more below ours. The answer is that Nature has blessed us with the Gulf Stream, with a storage for heat in the form of surrounding seas, and with a prevailing wind warmed by the water. In other words, Nature relies on the hot-air principle, known as convection, even more than on the direct radiant heat of the sun. There is nothing, therefore, in the stock argument about "Nature's way." It is necessary here to mention that radiators ought to be called "convectors," since their function is to warm the air by convection rather than to heat objects by direct radiation like the sun or the open fire.

How has the prejudice against warm air arisen? It is safe to say that it is due to the lack of ventilation usually associated with steam, hot water, or hot air heating, and, in addition to this fatal stagnation, the rooms are nearly always over-heated. Stagnation of the air reduces its cooling power and a feeling of oppression results which is relieved when the air is set in motion, hence the use of fans in the theatre. Within reasonable limits vitiated air in motion is preferable to motionless pure air. When sitting in front of an open fire one is ready to tolerate more draught than when sitting in a room heated by a radiator, and this is the main reason why the open fire is regarded at the healthiest form of heating.

The open fire is terribly inefficient, and a dweller in a cold country would never think of relying upon it. His objections are, (*a*) that it warms one side of him by radiation while the cold air freezes the rest of him; (*b*) that only about 25 per cent. of the available heat from the fuel is utilised. In other words, for every £1 spent on fuel for the open fire 5s. worth of heat is obtained and 15s. is wasted. This is not a good bargain.

Where, then, does this enormous quantity of heat go, and why do we not use it? Normally it goes up the flue and heats the solid brickwork of the chimney before it escapes, still hot, into the open air to warm the countryside. This applies in varying degrees to the heat from stoves, ranges, open fires, and even to gas fires. Experience shows that if a stove is placed 20 ft. away from an ordinary fireplace and connected to the flue with 5-in. sheet-iron piping, laid nearly horizontally, the heat obtained from the 20-ft. length of piping is greater than that obtained from the stove itself, and, more astonishing still, the heat of the pipe where it enters the wall is not noticeably less than where it leaves the stove. A further 20 ft. of vertical piping would, therefore, provide almost as much heat as the original length. The heating surface of an ordinary coke stove may be taken as about 7 sq. ft., while the 20 ft. length of 5-in. piping presents 26 sq. ft., up which all the hot gases have to pass. It is not, therefore, astonishing that the heating power of this pipe exceeds that of the stove and is equal to a very large series of hot-water radiators without entailing any of the cost. The heating value of such a pipe is greater when it is dull black than when it presents a bright surface.

But, it will be argued, admitting the efficiency of the flue, there are obvious difficulties when it comes to using it. It is unsightly, and the heat is concentrated and cannot be carried to convenient points as can hot water. It is in heating the basement passages of large houses that such horizontal flues can be of the greatest service, for if a basement can be kept warm and dry the house itself will be free from the chill that has its origin in cold and damp basements; draughts will be warm instead of cold, and the floors of the rooms above will be warm—an important point as the Romans well knew when they went to so much trouble to heat their floors by means of flues. The basement may sometimes be used as a further source of heat by placing the stove there in a small hot chamber with a grating over it in the ceiling leading to the main centre—generally the staircase hall—of the house. The cool air supply must be admitted into the hot chamber through large openings near the floor, and it should be noted that even this air, before the stove has warmed it, is not unduly cold because it has been heated by the flue-pipe to which reference has already been made, and which lies mostly outside the hot chamber. The writer has experimented with this method and has found that the uprush of hot air into the body of the house is remarkable and of the greatest value in keeping the house dry. Where the basement is a small one and all in use the grating may not be desirable because sound, and often the smell of cooking, would be communicated to the floor above.

In small houses that have no basement experiments should be made in the utilisation of flue heat, whether from the kitchen range, when the hot gases could be allowed alternative routes for summer and winter, or, better still, from a stove in the main hall, which

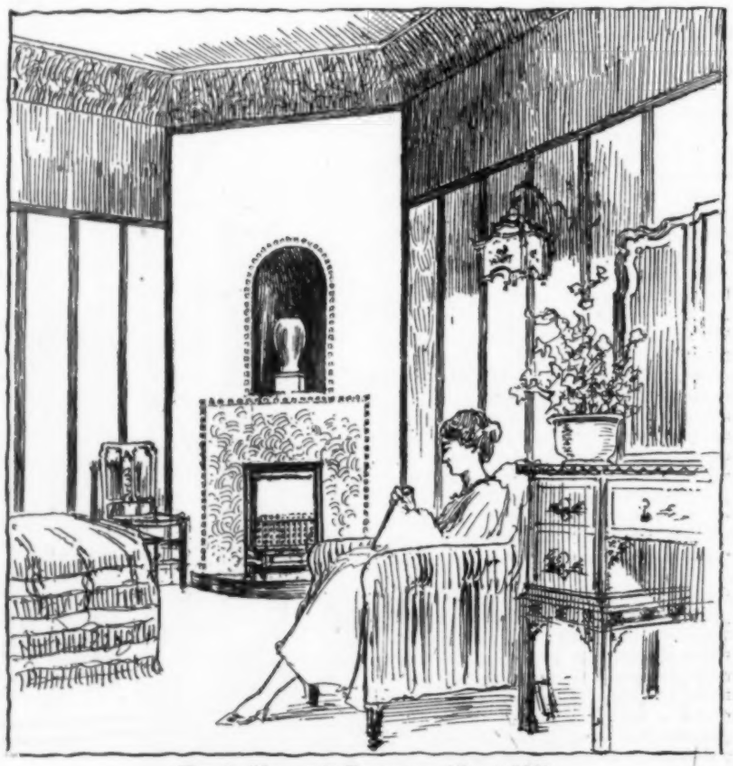


Fig. 2. MATRON'S BEDROOM. (*See p* 564).
British Empire Exhibition: Gas Exhibit.

would only be lighted when the house required warming. The main difficulties are:—

(1) To distribute the heat to different rooms.

(2) To ensure against the danger of iron flues perishing, and to provide for renewal.

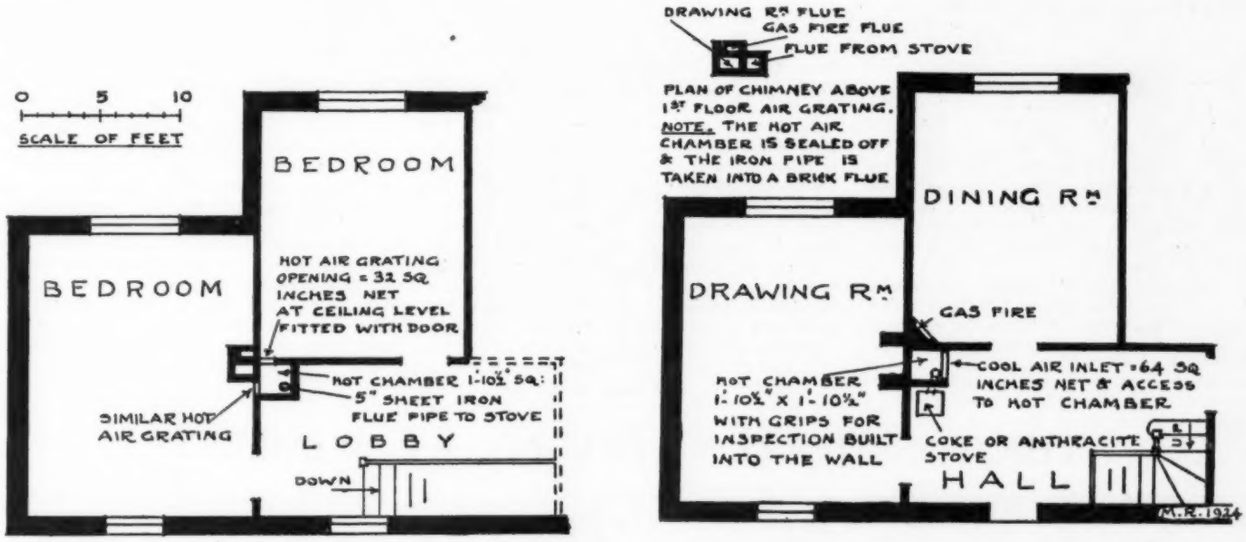
(3) To guard against the danger of fire from the hot piping.

The diagram illustrates a possible method of utilising the flue heat from a stove in the hall to warm two bedrooms over, and the above-mentioned difficulties are met as follows:—Heat is distributed from a hot chamber which contains the iron flue-pipe; the cool air from the hall enters through a grating near the floor; in the chamber it is heated by the flue and rises to the upper part of the chamber, which is sealed off; just below the top of the chamber hot-air gratings are fitted into its walls to deliver into the bedrooms. These gratings are placed near the ceilings of the first floor rooms, and are fitted with air-tight doors that can be closed at will. The hot chamber should be large enough to allow a man to climb up in comfort for inspection and renewal of pipes; an access door should be placed at the bottom and hand-grips built into the wall to facilitate examination. The hot chamber, being built of 4½-in. brick or 4-in. concrete blocks, would be safe from fire, being itself constructed like a flue, and the pipe would be clamped at intervals in the corner, delivering into an ordinary brick flue where the hot chamber ends. The hot-air inlets to the bedrooms are placed high up to tap as much flue heat as possible, and to avoid excessive communication of sound. Experience shows that a radiator or other source of heat near the ceiling is not appreciably less efficient than the same supply of heat placed low down, for the hot air in the latter case tends at once to rise to the ceiling.

The diagram, for convenience, only shows two bedrooms on the first floor, but the hot chamber could be carried up to warm rooms on the second and third floors provided that the cool air inlet was proportional to the size of the outlets. The hot chamber is here shown connected up with an ordinary chimney stack containing a common flue and a gas flue, but the chamber could contain more than one flue.

In a house fitted with the system shown in the diagram the entrance hall would require a full allowance of fresh air from outside, or the hot chamber could receive its air supply direct from the open. Warm air circulating through the rooms would permit of open windows, and air stagnation could be avoided. The attraction and associations of the open fire are deeply rooted, and such a fire contributes definitely to the appearance of comfort and warmth; if we could obtain a cheap and efficient smokeless fuel and utilise the flue heat, the objections to the open fire would be removed. The principle of the hot-air chamber would be equally applicable to the open fire, and by its aid we could save a large proportion of the 75 per cent. heat value which we normally send to waste. Even the most up-to-date and approved methods of central heating as a rule make no provision concerning the flue.

Heating is in its infancy, especially in England. Sooner or later we shall be forced to break away from the 25 per cent. efficient open fire and brick flue. These tentative notes are written in the hope that those interested will carry out experiments and publish any satisfactory results they may obtain.


0 5 10
SCALE OF FEET
BEDROOM
BEDROOM
HOT AIR GRATING OPENING = 32 SQ INCHES NET AT CEILING LEVEL FITTED WITH DOOR
HOT CHAMBER 1'-10½" SQ:
5" SHEET IRON FLUE PIPE TO STOVE
SIMILAR HOT AIR GRATING
LOBBY
DOWN
FIRST FLOOR
DRAWING Rm FLUE
GAS FIRE FLUE
FLUE FROM STOVE
PLAN OF CHIMNEY ABOVE 1st FLOOR AIR GRATING.
NOTE. THE HOT AIR CHAMBER IS SEALED OFF & THE IRON PIPE IS TAKEN INTO A BRICK FLUE
DINING Rm
DRAWING Rm
GAS FIRE
HOT CHAMBER 1'-10½" X 1'-10½" WITH GRIPS FOR INSPECTION BUILT INTO THE WALL
COOL AIR INLET = 64 SQ INCHES NET & ACCESS TO HOT CHAMBER
COKE OR ANTHRACITE STOVE
HALL
M.R. 1924
GROUND FLOOR

THE ALL-ELECTRIC HOUSE

BY AN ELECTRICAL EXPERT.

In the last few years much progress has been made in the commercial application of electricity to other purposes than lighting. Electricity for heating, cooking, and for the operation of labour-saving appliances in the home is, in fact, rapidly ceasing to be a novelty. The index to this development is to be found in the annual reports of electricity supply undertakings, and from all parts of the country unexpectedly rapid increase in the domestic load is recorded. It is of importance that the nature of this development should not be misunderstood. It is not a transitory phase, but the outcome of the definite policy now generally being applied of encouraging domestic electrification. The reasons and circumstances dictating this policy need not concern us here. Suffice it that it exists and is being steadily pursued. This simple fact is of very considerable importance to the architect and builder. Hitherto, though the flexible nature of electricity and the fact that it can be applied with advantage to heating, ventilating, cooking, and other purposes may have been appreciated, it has never really been considered feasible to adopt it for all these services in a single building owing to the practical objection of excessive cost. Even in the comparatively few areas where cheap rates for electricity have obtained for many years the large outlay involved in respect of initial cost of the equipment has been a deterrent to complete electrification. To-day these barriers have been largely removed.

The two most important manifestations of the desire of the electricity supply industry to encourage the domestic load have been (*a*) the adoption of special tariffs, or scales of charges, whereby electricity has been made available for heating and cooking on a competitive cost basis with alternative agents, and (*b*) the introduction of hire and hire-purchase facilities for equipment of every type. The results have been so far successful that it may be justly claimed that the novelty stage is passed, and though we are still in the early days of the domestic electrification era the All-Electric house is a fully practical proposition in many electricity supply areas to-day. So far we have confined ourselves to generalities. They are necessary in order that a broad idea of the situation may be presented. We may now, however, turn to a concrete example to demonstrate that the All-Electric house can be operated not only economically but actually more cleanly than a similar dwelling on more conventional lines.

In connection with its housing scheme at Riddrie the Glasgow Corporation decided to test out practically the All-Electric house idea. Two of the standard type houses being erected were equipped throughout for electrical service. The only difference between them was that in one house a single coal fire was retained for heating the main living room, and in conjunction with this a boiler was fitted to furnish a bulk hot-water supply; the other house was completely "All-Electric." These houses, which were put into service in February, 1922, consist of a living-room, drawing-room, three bedrooms, bath and kitchenette. The cost of erection was slightly more than £1,130, and the complete electrical installation amounted to a further £80 16s. 6d., making a total of approximately £1,211. The figure of £1,130 was really the builder's estimate, the actual cost being increased slightly owing to unforeseen fluctuations in the cost of labour and materials

during construction. It is the better figure to employ, however, when arriving at the percentage cost of the electrical equipment compared with the total cost; this works out roughly at 6½ per cent.

As the result of forty-eight weeks' occupation under normal conditions of use, etc., the running expenses of the above two houses worked out as follows:—

In the All-Electric house the electrical energy consumption was 5,350 units for the total period, or 103 units per week. At the tariff in force, viz., a fixed charge of 2s. per week plus ½d. per unit used—the cost works out at £5 4s. 0d. fixed charge, £11 2s. 11d. energy charge, making a total of £16 6s. 11d. The average outlay then for lighting, heating, cooking, water heating, clothes washing, ironing, and use of all other electrical appliances was 6s. 4d. per week.

In the electric house with one coal fire the corresponding figures were: £5 4s. fixed charge, 4,166 units at ½d., £8 13s. 7d. energy charge, or a total of £13 17s. 7d. To this must be added the sum of £4 11s. for the coal used during twenty-six weeks, from the end of October to the beginning of May, which brings the total cost up to £18 8s. 7d., the average all-in figure being 7s. 1d. per week.

The above figures supply concrete testimony to the fact that electrical service is not the fabulously expensive myth of popular fancy. The actual tariff charge is, of course, an important matter. In the case quoted it is the standard rate for public supply in the Glasgow area, and this is in some respects typical of the special competitive tariffs now being introduced to encourage a greater use of electricity for all domestic purposes. It is quite a simple matter to ascertain with the aid of the consumption figures given what the cost would be for any rate.

It is of interest that the Riddrie estate also furnishes comparative figures for the running expenses of the type of house in question when gas and not electrical service was employed. Without going into details it will not be out of place to present the respective figures in summary form, together with other data germane to the matter. They are as follows:—

1. Riddrie "All-Electric"	£16	6	11
2. Riddrie "Part-Electric"	18	8	7
3. Riddrie "All-Gas": 26 weeks (winter) at 10/6 recorded, plus 26 weeks (summer) at 5/3, estimated	20	9	6
4. Riddrie "Part-Gas," say ditto	14	0	0
5. Kirkhill "All-Gas"	29	8	3
6. Maryhill, electricity for lighting, gas for cooking, and coal for heating	18	1	10½

From the above figures, which are the records of practical experience, it is plain that electricity for domestic service is quite competitive with alternative methods even on the basis of running cost.

The All-Electric houses dealt with, it may be noted, were simply standard dwellings equipped for electrical service, the cost of the installation and apparatus being in the nature of an extra to the actual outlay on the building. Had they been designed primarily with a view to electrical operation the design could have been materially modified and an appreciable saving effected in the building cost by the elimination of grates, chimney breasts, and flues which, with electric heating, are superfluous. In connection with a number of All-Electric houses that have been erected in various parts of the country where this has been done, it has been found that the saving in constructional outlay more than compensates for the cost of the whole of the electrical equipment. Due to this the All-Electric house is actually no more expensive to build and equip than its counterpart on more conventional lines; it may be appreciably cheaper. In addition to saving money the elimination of chimney breasts increases the available space in a room and allows much greater scope in respect of the interior arrangements.

Though actually the fully All-Electric house proved slightly the more economical in the case of the Riddrie houses, this is not the form generally advocated. Conservatism in domestic matters is extraordinarily strong, and the last thing the British housewife cares to sacrifice to the demands of scientific management is the coal fire. Without it there is nothing to poke, while the strong psychological effect of an open grate fire cannot be denied. As a concession to these two factors it is usually considered desirable that one coal fire should be retained even in an otherwise All-Electric house. Where this is done there is a good case also for retention of the high-pressure saddle-back boiler for bulk domestic hot-water supply, and the combination of these two is, as a rule, to be recommended. The single coal fire with high-pressure boiler is best installed in the main living-room, and provision should be made for electric hot water supply during the summer months, and for auxiliary supply in the winter.

Hitherto most of the activity in respect of the erection of All-Electric houses has been municipal. The private builder and the architect, except in one or two isolated cases, have not tackled the problem on a comprehensive scale. But the time is at hand when it may be anticipated that they will find it desirable to do so. Electric lighting has long been recognised as a commercial asset to builders. Electric cooking and heating are really very much greater ones. The former allows the preparation of food to be carried on with the minimum of trouble and with absolute certainty of uniformly good results, while the latter enjoys all the advantages of convenience associated with electric light applied to heat. It is not, however, the intention to write an eulogy of electricity or to decry other methods which are of proved value. But because electricity widens the scope for the architect in the application of his art the claim that electrical service is the best and an economical one at least deserves investigation.

THE GAS HEATING EXHIBIT AT WEMBLEY

ARCHITECTS and builders are constantly confronted with problems regarding lighting, cooking, heating, water heating and other domestic services for cottages, residences and other buildings with which they are dealing. At the Gas Exhibit at Wembley modern methods of treatment of all these matters are very clearly and practically demonstrated, regarding which details of a general character have already appeared in *The Builder*. In our special Heating and Ventilating Number, however, we feel that it will be of interest if we set out some further particulars regarding that portion of the exhibit which specially demonstrates what gas can do—and is doing—in the direction of heating, and also particulars of an interesting system of ventilation.

For a number of years past architects, heating engineers and builders have been informed by those connected with the gas industry that great improvements have been effected in gas fires, and in the general science of gas heating. They have also seen many illustrations of gas fires of modern type, and have naturally had actual experience of a number fitted in residences and other buildings with which they have been dealing, or have come in contact. At the Wembley Gas Exhibit, however, it has for the first time become possible fully to realise the advance which has been made in the direction of the provisions of a comprehensive range of gas fires of plain and "period" designs, in a number of attractive finishes.

The Gas Fires in the Main Hall and Lounge.

Apart from some heating exhibits of a special character which are referred to later, all the gas fires are shown in the main hall and lounge and the ante-room. In this part of the exhibit there are no less than 23 "named" designs of gas fires of various sizes, in which are included examples of the following periods or schools:—Georgian, Adam, Early Victorian, Italian, Tudor, Jacobean and Modern. These designs are carried out in one or other of the following finishes:—Plain black, oxy-silver, satin-brass, oxy-copper, antique gold, copper-bronze, stippled grey, armour bright, copper, and dull silver. An important feature of the exhibit is the very carefully chosen setting of rooms and fireplaces, in and against which the fires are fitted, and by an inspection of which it can be realised that one can now obtain a gas fire to harmonise with any surroundings likely to be met with in residences or buildings, either ancient or modern in character.

The Model Rooms.

The series of model rooms—some of which are descriptive of the "Seven Ages of Woman," to which reference has been made from time to time in the public Press—contains some fine examples of gas fires, those installed in the children's playroom and the student's bed-sitting room each being equipped with a very useful gas ring of neat design and appearance. A selection from some pen-and-ink drawings by Mr. T. R. Davison will convey a far better impression of these model rooms, and the gas fires fitted therein, than could possibly be conveyed by any descriptive matter. Figs. 1 and 2 are drawings of two of the rooms in the "Seven Ages of Woman" series, Fig. 1 being the student's bed-sitting room, in which may be noted the "Winchester" gas fire in oxy-copper finish, with a boiling burner attachment, and a small cupboard at the side of the fireplace in which the small "coin in the slot" meter is fixed. Fig. 2 is the "matron's" bedroom, with an "Adam" gas fire of satin-brass finish. Figs. 3 and 4 are illustrations of a pair of really fine rooms with appropriate gas fires, which undoubtedly enhance the general effect of the decorative scheme. These rooms are not included in the "Seven Ages of Woman" Tableaux, Fig. 3 being representative of a doctor's consulting room with a "Carolean" gas fire of oxy-silver finish, and Fig. 4 a business man's room with a "Westminster" gas fire of copper-bronze finish. The Ante-room, between the Main Hall and Lounge and The Domestic Science and Industrial Hall, contains two fires of the old dog grate type, known, respectively, as the "Lansdowne" and the "Raphael." These fires are fitted to a fine pair of marble fireplaces and mantelpieces of Adam design. Fig. 5 illustrates the "Raphael" fire, which has a dull silver finish. The remaining special heating features to be seen in the Main Hall are the three pylons which are erected down the centre, placed at such distances apart as to give a satisfactory balanced effect.

The Three Pylons.

These pylons are hexagonal in shape, and the six gas fires which are fitted to each are set against backings of marble and tilings of various designs and colourings, in order that the artistic mind can decide the type of fire which will look best in any situation which is to be dealt with. With a view to catering for the kind of room and fireplace which is usually found in houses occupied by those whose means are limited, or which call for fires of absolutely plain design and black finish, one of the pylons contains a selection of this type of gas fire. They are quite inexpensive to purchase, and many are hired at low rentals from a number of gas undertakings. Fig. 6 gives an impression of a general view of a portion of the Main Hall and Lounge, some of the model rooms and two of the pylons. It is worthy of

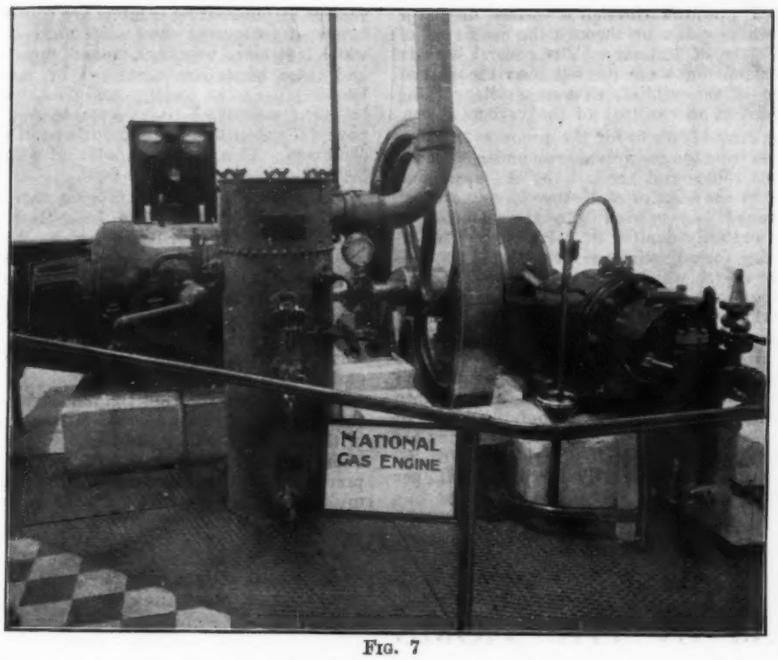


FIG. 7

note that part of the general lighting of the Main Hall is obtained from the artistic semi-indirect fittings which are superimposed above the pylons, and add tone to their design. Clusters of modern inverted burners—of the pattern adopted by the London County Council for relighting by gas more than 100 of their schools—are fitted within the bowls. The lighting fittings and shades in the model rooms are also worth more than a passing glance: a feature of special interest to visitors being the ease with which the gas burners may be switched on and off.

Methods of Fixing Gas Fires to Old-fashioned Grates.

An interesting exhibit to the architect or builder may be seen in what is known as the Domestic Science and Industrial Hall, where a number of examples of old-fashioned hob and register coal grates are shown, with suggested methods of treating them with asbestone or sheet iron backings, against which gas fires are fitted. Such grates have always presented difficulties to those who have wished to instal gas fires, but it is here clearly demonstrated that with proper treatment very pleasing results are obtainable. Two instructive methods of installing the rapidly increasing "built-in" gas fire complete with mantle, are also shown here, one of which has the "Economy Flue" constructed in concrete blocks, and the other in brickwork, in the thickness of the wall.

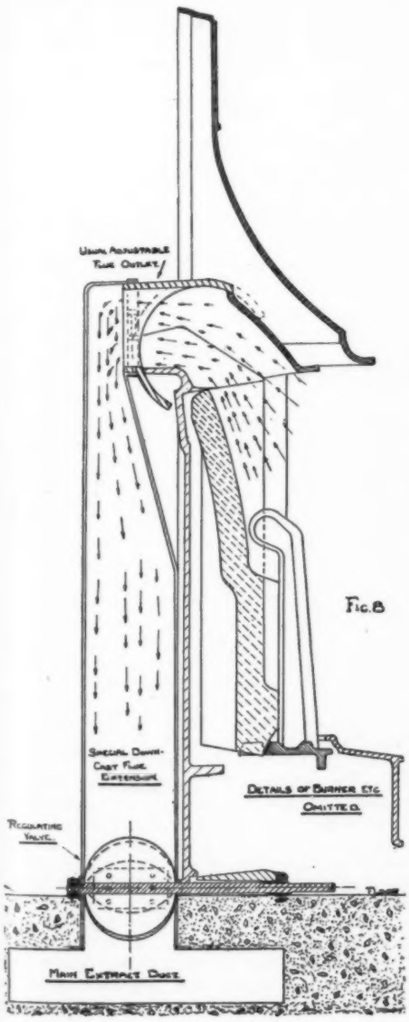
The foregoing is a short account of the principal features of the exhibit as far as gas fires are concerned, and though much more might be written on the subject, it is necessary to pass to a matter which is of particular interest to ventilating engineers, and to those who desire to generate electricity on their own premises.

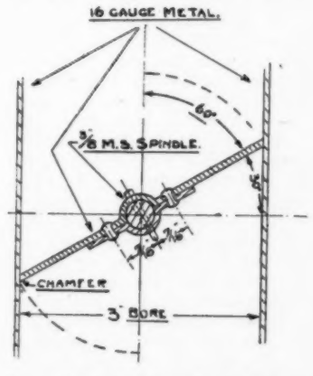
The Ventilating System.

When passing through any portion of the Gas Exhibit the casual visitor does not realise that the building is only a shell of walls erected within another building—the Palace of Industry—and that windows, ventilators, flues and chimneys of the kind which are ordinarily met with could not readily be introduced into the structure. Yet, if the exhibit was to be a real example of what the gas industry can accomplish, it is obvious that gas apparatus of all kinds, including those for lighting, cooking, water heating, heating and—last, but by no means least—those for industrial processes, must be shown burning, many of them at one and the same time, in a fairly confined space. It was also necessary to make suitable arrangements for dealing with the vitiated air arising from the breaths and bodies of crowds of visitors. It was evident, therefore, that a system of ventilation must be carefully thought out. That this was successfully accomplished must be admitted by anyone who has seen the gas lights, fires, water-heaters and cookers burning, and the industrial processes, such as sweet making, aluminium melting, pottery firing, and metal cutting simultaneously carried on.

The Gas-Engine Generating Set.

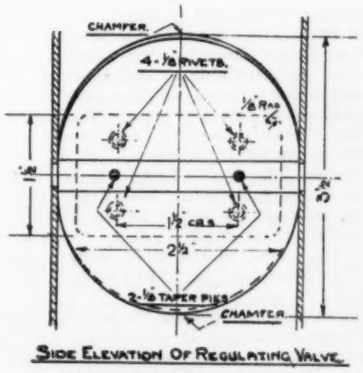
The necessary power for the system is provided by a gas engine which has run without a break during the "open" hours ever since the Exhibition started. The power unit consists of one of the National Gas Engine Company's "P.E." type gas engines fitted with a specially heavy wheel for electric driving, and giving a maximum load of 20 B.H.P. on town gas. This engine is coupled direct by means of a flexible coupling to a current generator, having an output of 12 k.w. at 220 volts. This is a compound wound machine, of the standard type manufactured by the Lancashire Dynamo and Motor Company, Ltd. The speed of the set is 275 revolutions per minute. The switch-board is a two-panelled board of enamelled slate, having floor and wall supports. The generator panel is fitted with a 6 in. dial, moving coil ammeter, and a 6 in. dial, moving coil voltmeter. It has a back-of-board shunt field regulator, double pole switch, and two single pole fuses. The second panel is a feeder panel, arranged for four feeders, each being controlled by a double pole switch and two single pole fuses. The complete installation makes a compact and efficient generating unit, specially suitable for cinemas, and various industries where a fairly large supply of electricity is required at a cheap rate. The hourly gas consumption of the engine is 10,000 B.Th.U. per B.H.P. at full load (say, 20 cubic ft.), and the consumption necessary to produce each k.w. hour at the full output of the generator is approximately 16,000 B.Th.U. (say, 32 cubic ft.), by which, with gas for power purposes at 6½d. per therm (some gas undertakings sell it at less than this) electricity may be generated at about 1d. per unit. The engine starts up easily, and runs satisfactorily under all conditions of load, and the set needs practically no attention. Fig. 7 is a photograph of the complete set, including a waste heat boiler, in which steam is raised by the exhaust gases from the engine.





FRONT SECTIONAL ELEVATION REGULATING VALVE. SHOWN CLOSED.

Fig 9.



SIDE ELEVATION OF REGULATING VALVE. SHOWN OPEN. SPINDLE OMITTED.

The Intake and Extract Fans and Ducts.

The ventilation is carried out by two separate systems, one of which supplies fresh air, whilst the other exhausts the vitiated air, in addition to the products of combustion from the gas apparatus and the vapours, &c., from the various manufacturing processes. The whole of the fresh air is supplied by one centrally-situated motor driven fan of specially light construction, the air being distributed by means of a system of sheet steel ducts run for the full length of the building under the two platforms between the main hall and the Industrial and Domestic Science Hall. This fresh air fan is driven by a 2 h.p. motor and is capable of providing 500,000 cu. ft. of air per hour.

The exhaust system consists of four direct coupled motor-driven extract fans, which are installed in four fan chambers, situated in suitable positions in the exhibit. These fan chambers are made air-tight and the various exhaust ducts are connected to them. In each case the extract fan creates a suction in the chamber, thus pulling products of combustion, vapours and vitiated air into the chamber; they are then picked up by the fan and discharged upwards through a vertical discharge duct which passes up through the main roof of the Palace of Industry. The general extract ventilation ducts are erected over the plaster ceiling of the exhibit, exhaust gratings being provided in the ceilings of the various rooms.

The removal ducts for the products of combustion from the gas fires are run underneath the various rooms and the pylons, the usual flue outlet at the back of each stove having a short downward flue carried into these ducts. A small butterfly damper or valve is provided to each fire, for adjusting the strength of the pull to the degree which is necessary for the satisfactory removal of the products of combustion from the burning gas, and to create an additional ventilating effect through the canopy of the fire. Fig. 8 illustrates the method by which the products of combustion from each gas fire, and the moving air, are conveyed downwards into the extract duct, and Fig. 9 contains details of the butterfly valve. The four exhaust fans are together capable of dealing with 80,000 cu. ft. of air per minute—nearly five million ft. per hour.

The products and vapours given off from the various manufacturing exhibits are collected by means of galvanised sheet steel hoods—one of which is situated over each piece of apparatus—and these hoods are connected by means of branch pipes to an underground duct, which is, in turn, connected to a separate and more powerful exhaust fan situated in one of the fan chambers. This fan is capable of extracting 300,000 cubic ft. of air per hour.

The ventilating installation was carried out by Messrs. J. Jeffreys & Co., Ltd., Heating and Ventilating Engineers, Barrons-place, Waterloo-road, S.E., and is of considerable value as an indication of a method of heating by gas fires and other use of other gas apparatus, including factory appliances, in premises where no flues, or upwards flues, are possible or permissible, and where some kind of pressure system with down-cast flues is considered necessary.

In conclusion, it is not too much to say that the Gas Exhibit as a whole is a striking example of the fact that utility and beauty can be combined without detriment to either, and that practical and utilitarian matters need not be unaccompanied by artistic effects and dignity of appearance.

GAS IN THE HOME

The following notes descriptive of the Gas Exhibit at the British Empire Exhibition are by Mr. H. Austen Hall, F.R.I.B.A., architect to the Exhibit.

The purpose of this exhibit is to present the different uses of gas for all purposes of light, heat and power, in all phases of modern life. With this object in view, the exhibit takes the form of two large halls containing model rooms in which gas lighting and heating are shown in conjunction with suitable decorations and furniture, such as would be met with in rooms for different purposes. Thus on one side there is the "Seven Ages of Woman," from nursery times to old age, in a series of rooms, by Messrs. Heal & Son. These rooms are remarkable for the freshness and variety of their treatment and the versatility that is displayed in the expression of life under different conditions. The colour schemes are studied to give variety to the general scheme, and show some entirely new settings for gas fires.

It is desirable to think in terms of gas rather than coal if a successful treatment of gas fires is to be evolved, and there are shown some excellent suggestions for the modern gas fire and its setting. The fires have been selected in the first instance, and the surrounds have been designed to harmonise with them, thus avoiding the haphazard look that sometimes occurs in a new building. A series of period rooms are provided opposite those of modern design, to which they form a contrast. These are the work of Messrs. Osborne & Co., of Grafton-street, who show the styles of decoration from Queen Anne to Early Victorian. The fireplaces are well chosen and illustrate the wide range of designs that the makers of gas fires have placed upon the market.

The inner hall is devoted to the application of gas to water heating, cooking, and many forms of industrial undertakings. The general design of the interior is on simple classical lines, with coved ceilings, the whole being painted in simple grey and gold tones, which set off the brighter colours of the rooms around them. Artificial light is by means of three inverted bowls raised upon pylons in the centre of the room, a method of flood lighting new to gas, and highly successful in this case. There would appear to be considerable possibilities in the use of standards instead of pendants in large rooms such as these, and the idea could be developed in banks and buildings of a similar nature. The pylons also provide good places for the display of gas fires, and illuminated panels for advertising gas for all purposes.

Externally, the feature is the entrance porch, which projects to correspond with the other work in the Palace of Industry. The design is on classical lines, and relies upon the largeness of the scale rather than ornament to give the necessary dignity to the entrance. Space is provided for the smoke abatement exhibit, and the historical section, and also for the exhibits of the Sulphate of Ammonia Federation.

MODERN INDUSTRIAL LIGHTING

The deplorably bad state of factory and workshop lighting at the present time becomes very apparent when one compares the existing general standard with that recommended by specialists in illumination. Depending on the nature of the industry and the particular department of the works, good illumination in engineering factories is indicated by a standard of 5 to 10 ft. candles on the working plane. Considering that Home Office Factory Regulations recommend a minimum illumination of from .25 to .4 candle-power (this is on the floor level, however), the average value must be appreciably less, and the vast discrepancy between good lighting and present-day practice is only too plain. There are a number of reasons for this, and much might be written concerning them. That, however, is not our intention. Rather it is desired briefly to indicate what constitutes correct illumination and its very concrete advantages to the factory or works owner. Merely by doing this, many of the more obvious faults common in existing installations will be exposed.

First we have to consider the source of light—the lamp filament. It is intensely brilliant—particularly so in the case of the modern high candle-power gas-filled lamp. Like the sun it is dazzling to look upon and must be shielded from the direct line of vision of the workers. Light is emitted in every direction, and only a relatively small proportion is delivered downwards on to the working plane in the case of a lamp freely suspended. A reflector is therefore necessary to deflect downwards the light which would otherwise be wasted in illuminating the ceiling and factory walls. If the maximum amount of light is to be concentrated on the working plane, the reflector must be designed to that end, and so must be scientifically proportioned to suit the particular type and size of lamp in conjunction with which it is to be used. We arrive, then, at the fundamental requirement of a good lighting unit—a lamp housed in a suitably designed reflector. To obviate glare the bottom half of the lamp bulb should be frosted or otherwise obscured from direct vision. Though this conception of a good lighting unit has been led up to in a somewhat elementary character, no apology is deemed necessary, since it is the keystone on which correct lighting is built up. It is also the one essential most frequently neglected. Almost any factory one cares to enter would furnish an example. Just as one cannot put new wine into old bottles without risk of disaster, so it is impossible to put modern lamps, more especially the gas-filled type, into obsolete reflectors and get correct illumination. The lamp and its reflector must be regarded as one indivisible whole.

Comparatively recently standard industrial lighting units have emerged, and a uniform type is now made by a number of manufacturers. The illuminating and light distributing characteristics of these units can be relied upon within the usual tolerance of commercial production, and it has thus become possible for the illumination expert to plan a correct lighting installation to give any predetermined quality of illumination with a very considerable degree of accuracy.

The installation of good lighting units does not of itself ensure correct illumination. Each unit will, for the sake of simplicity, be assumed to deliver downwards a cone of light. Actually the form of the light beam may not be conical nor well-defined, but the assumption that it is so will help our explanation, and the basic principle is the same in any case. Now the intensity of the illumination on any horizontal plane through the light cone will vary with the actual distance from the light source. It will also vary at different points on any one horizontal plane, the highest intensity being in the area immediately under the lighting source and diminishing as one goes outwards away from the central point.

If, then, uniform lighting is to be secured on the working plane, and it is desirable in factories and workshops, apart from any additional local lighting that may be necessary in special cases, that all the workpeople shall be afforded the same quality of illumination—the height at which the lighting unit is suspended above the work is a matter for consideration. Also, in the case of two or more such units, they must be so spaced apart that, with their cones of light overlapping, uniform illumination is secured on the working plane, both directly under the lighting units and at any point intermediate between them. Precisely the same applies as between two rows of lamps, as it is essential that a workman operating not immediately under but in the space between two rows of lighting units should not cast a shadow on his work. This question of uniform lighting over the working area is a fundamental requirement in the majority of cases. It is not necessary that the illumination be of equal intensity throughout a workshop; it may differ in various bays to suit the requirements of individual classes of work, while the general lighting to make moving about safe need not be of the same high intensity as over a working area; special local lighting may also be required for some purposes. But in any one area devoted to one class of work, uniform illumination is a desideratum.

There is more than one way of securing reasonably uniform illumination. A small number of high candle-power units can be arranged to give the same quality of light as a large number of smaller units. But there is an important difference in the two cases. The fewer the number of light sources, the fewer the number of cones of light intersecting with one another and producing a uniform intensity over the area illuminated. Benches and machines, even the work itself, may in such cases throw harsh, or black, shadows. This is usually a disadvantage. On the other hand, with a large number of light sources of lower candle-power, intense shadows will not be obtained, as the total illumination at any point is derived from many directions. Shadows will then be what are known as soft or "luminous." Even if it were possible to secure entirely shadowless illumination, it would not be advantageous to do so. Some difference in the intensity on the various surfaces of any object, such as, for example, the work itself, is necessary for its "form" to become apparent. We are now able to appraise the essential characteristics of correct illumination in factories and workshops—uniform lighting of high intensity throughout a working area by glareless light sources so arranged as to throw not harsh but luminous shadows. Reference is not here made to the lighting units, their height of suspension and spacing. They are only incidental, a means to an end—the delivery of the correct quality and quantity of light at the place where it is required. Necessarily much has been omitted that could be written on this subject, but we may add that the actual details of lighting installations may vary widely in different cases. Such details are hardly worth theorising over; they primarily concern the illuminating engineer in the application of his knowledge.

Good lighting costs money. So also does bad lighting; and the difference is small, out of all proportion to the benefits derived from the former. It has been proved by practical test that high-intensity correctly arranged lighting has a direct beneficial effect on the output of a factory. Here are some suggestive figures that can be vouched for on reliable authority. They relate to the average results obtained in the case of ten different industries. By increasing the average original lighting intensity from 2.3 to 11.2 ft. candles an increase in production of 15.5 per cent. resulted at an additional cost for lighting corresponding to a 1.9 per cent. increase in the pay-roll. Any new or improved productive machine that could offer but half as good a proposition would immediately have a vogue. The fact that correct lighting increases output is attributable to the greater ease with which it enables work to be carried on, the saving in actual time normally wasted in taking work under a lamp for inspection or measurement, and the direct stimulating effect high-intensity illumination has on the operatives, who are naturally getting fatigued towards the end of the day. There is another important factor that makes correct illumination worth while. Accidents during hours of artificial lighting occur at a far heavier rate than during the daylight periods of working. Thirty per cent. is about the measure of the increase, and this does not take into account the fact that hours of artificial lighting are far less than those of natural daylight. If the "Safety First" campaign one hears so much about means anything, it means that good factory lighting is not only justified but is a necessity in the interests of humanity.

In conclusion, the following figures, which give the minimum intensities recommended by lighting specialists for various classes of workshops will be interesting:—

Foundries—	Min. Ft. Candles.
All processes other than fine moulding and core making	5
Fine moulding and core making	10
Machine shops—	
For rough operations	6
For medium operations	9
For fine operations	12
Fitting shops—	
For rough operations	5
For medium operations	8
For fine operations	10
Drawing office	10

The above intensities are recommended as being justifiable on a strictly commercial basis.

SOME ASPECTS OF THE VENTILATION PROBLEM

MR. RONALD GRIERSON, A.M.I.E.E., lectured at the Northern Polytechnic Institute, on this subject, some time back.

In the course of his lecture he said the art of the successful ventilation of offices, hotels, ships' cabins, theatres, workshops, and similar occupied spaces wherein human beings were, relatively speaking, crowded together, was probably one of the most difficult branches of engineering.

In bridge building, dynamo and ship construction, and railway work, the material with which the engineer worked was inanimate and consistent, and the finished products were more or less independent units. In ventilation work the engineering equipment must be applied as an accessory to a structure designed for a specific purpose, and compromise was not infrequently necessary. Further, it had only been possible hitherto to judge the result by the human senses, and, as everyone knew, individuals varied greatly. For a very long time, indeed, certain localities had had the reputation of being bracing and other localities had had the reputation of possessing a relaxing atmosphere, but so far the physiologists had not been able definitely and clearly to indicate to the ventilating engineer wherein laid the fundamental difference between the atmospheric conditions in the two localities.

In many other branches of engineering the scientific side was leading the applied side, but in ventilation it would probably be admitted that engineers were leading physiologists. Responsible ventilating engineers were prepared artificially to supply, and to maintain in any enclosed space, given the necessary facilities, practically any type of weather, from the coldest day in winter, to a warm, humid day in summer, and they were only waiting for the physiologists to standardise the air conditions that it was really desirable to maintain in given circumstances, in order to ensure the physical comfort and the health of the occupants. Since the majority of ventilating equipment was installed for the comfort and well-being of the human being, they might, with profit, devote a few minutes to considering it in detail from the points of view which chiefly affected the ventilating engineer.

It was a well-known fact, of course, that a steady or constant temperature could only be maintained in a mass of matter, living or dead, when the heat gained was equal to, or balanced, the heat loss, or output.

The whole problem was a particularly fascinating one, but in the short time available they must be content to accept the conclusion which a close study of the subject indicated. This was that excessive working of these heat regulating mechanisms of the body, caused by certain atmospheric conditions, produced feelings of discomfort in us in one direction or another, such as lassitude, headaches and ailments of a similar nature. Experiments showed that the rate of heat emission varied with the state of physical rest or work, and with the age of the person under test. For an adult male resting in bed it was as low as 275 B.Th.U.hr., and for the same adult walking at the rate of five miles per hour it was 3,030 B.Th.U.hr., or over ten times greater. The normal ventilation problem dealt, as a rule, with spaces in which people were at rest, or employed on light work, and the figure taken for heat emission was from 350 to 420 B.Th.Uhr., depending on the authority consulted.

The other products of combustion emitted by the human engine in the course of its run, of interest to the ventilating engineer or physiologist, were carbon-dioxide and water vapour. The volume of carbon-dioxide emitted also varied with the physical state, but in the above-mentioned conditions averaged 0.60 cu. ft. per hour. Water vapour emitted from the lungs appeared to average about 0.05 lbs. per hour, but they might rise to a value as high as 0.3 lbs. under certain circumstances.

So far they had only considered the total heat emission from the human body, but in order to be in a position to provide suitable weather by artificial means in occupied spaces, they must investigate the subject a little further in this direction, in order to ascertain, if possible, why they normally felt cheerful and fit on a bright day in spring, and depressed and feeble on a hot moist day in summer. Investigation and experience showed that the body lost or emitted heat in five ways, i.e.:—

Method.	B.Th.U.	% of total.
1. Rejection by waste products	7.9	1.9
2. Expired air	15.0	3.6
3. Evaporation from the lungs	31.3	7.5
4. Evaporation from the skin	60.5	14.5
5. Conduction and radiation	305.3	72.5
Total	420.0	100.0

Obviously the fourth and fifth methods, i.e., evaporation, conduction and radiation, which amounted to 87 per cent. of the total, were the most important factors, and those which were of primary importance to ventilating engineers.

The question of water vapour and relative humidity must be very briefly dealt with before they considered the question of the loss of heat by the evaporation of moisture from the skin. This was a slightly more complicated subject and was not so universally understood as the

CO_2 and heat factors of ventilation. It was, of course, a well-known fact that air was a mechanical mixture of various gases, ordinarily considered as consisting of oxygen and nitrogen, but also containing a small percentage of CO_2 and moisture or water vapour, termed humidity.

The weight of water vapour that a given space would contain depended entirely on the temperature and was entirely independent of the presence of air, except as regarded the effect of the temperature of the air. Relative humidity was the ratio of the weight of water vapour contained in a given space, to the weight of water vapour that the same space was capable of containing, when fully saturated at the same temperature.

Dew point was the temperature at which saturation was obtained for a given weight of water vapour, or the point when any reduction in temperature would cause condensation of some of the water vapour. Common examples were steamy windows and mirrors, tumblers containing cold drinks, slate shelves or walls, bathroom tiles, &c.

Any given amount of moisture had some temperature at which saturation will occur, just as any given quantity of water had a definite limited capacity to absorb alum. Any further lowering of the temperature will cause condensation. This—then—will be its dew point.

It was an established physical fact that heat must be absorbed when water or any liquid was evaporated, i.e., was converted or transformed from the liquid to the gaseous state; the commonest examples probably being those of a kettle, or saucepan, boiling dry, and the ammonia refrigerating machine. Contrary to the opinion commonly held, however, evaporation took place at all normal temperatures down to freezing-point. Those who served in the East during the war would recall the unglazed earthenware pots which, if filled with water and placed in a draughty place, rapidly cooled the contents, due to the evaporation of the moisture which soaked through the earthenware. In order, therefore, to ascertain the wet bulb temperature of the air they covered the bulb of an ordinary mercury thermometer with a clean, soft cloth, and arranged to maintain it in a moistened condition. A thermometer used in this manner would give a depressed or lower bulb reading than that of the dry bulb thermometer, in proportion to rate of evaporation from the wet surface of the cloth. The depression was a measure of the amount of moisture in the air. This depressed reading corresponded to the temperature at which the air would normally saturate, without any change in its heat content.

Dr. E. Vernon Hill, of the Chicago Department of Health, had carried out a very large amount of research work on the inter-related subjects of hygiene, ventilation and physiology, in an endeavour to answer the question raised in an earlier part of the paper, i.e., What was the combination of Physical, Chemical and Physiological conditions of the air that produced a bracing or a relaxing climate or atmosphere?

One of Dr. Hill's earliest experiments was to obtain figures for the heat emitted by the human body, by evaporation, and also by conduction and radiation under varying conditions of relative humidity, but with a fixed wet bulb temperature.

Experiments on students and staff by Dr. Hill showed that a constant wet bulb of 56 deg. Fahr. gave general satisfaction for an average person in a state of physical rest and with the air practically motionless. Provision was made for increased heat emission caused by varying conditions of work by a slight alteration in the wet bulb temperature.

Conversely, as the air motion increased, it was found necessary slightly to increase the temperature of the wet bulb if conditions of comfort were to be maintained. These results were collected and were shown in the form of curves in the graph. Obviously, if it were found by experiment that these curves represented comfortable and healthy conditions, it was possible to evolve a method whereby the air conditions existing in any room could be compared with the standard conditions, and the variation, therefore, could be figured as a percentage error of the ideal.

Such a scheme had been worked out by Dr. Hill, and was termed the Synthetic Air Chart. This chart was divided into seven main columns, the figures for the first five being obtained by direct test, and for the remainder by calculation from observed results. The last column was the summary of the test, and showed the comparison of the results obtained, expressed as percentages of the ideal. The base lines of each of the columns represented 100 per cent. ideal conditions for the six main factors of the air, as they were known to-day, i.e., it presupposed the most desirable relation of wet bulb to air motion; air entirely free from dust particles visible under a moderate power microscope, from bacteria and objectionable odours, unlimited in quantity and evenly distributed. The other extreme was at the top of the chart, and represented conditions that were so unsatisfactory that life would be maintained with difficulty, or would cease to exist. Perfect conditions were 100 per cent., and extreme conditions were zero. The eighth column was the summary of the others, and was completed by adding together the percentage penalisation obtained from the other columns and deducting the total from 100.

A comfortable, healthy room should show 95 to 100 per cent.; 90 per cent. was fairly good, 85 per cent. was only fair, and if the air condition showed only 80 per cent. immediate action was called for. If a 95 per cent. standard could be obtained without mechanical equipment, then there was no object in laying out capital on the installation of plant.

On the other hand, if an upward or downward f an system will produce the same result in a given building, when tested on the basis indicated by the Synthetic Air Chart, the system to be adopted would be decided on a financial and a convenience basis. Dust determination, with scientific accuracy was a matter of some difficulty and research. One method in common use now was to draw a volume of air on to a sticky plate. Counting was done under a cross-ruled screen in a microscope designed for a magnification of fifty diameters.

The determination of common aerabic bacteria, found in the air of rooms, was made by exposing standard 4 in. agar Petric plates in accordance with standard conditions. The plates were then incubated for 24 hours at room temperature, and the colony count was then made at the end of this period.

The investigation of odours was rather a difficult matter, since the only known method involved the human factor. Dr. Hill had analysed odours into nine different types, viz. :—

Aetherial, such as given off by fruits. Aromatic, such as camphor, citron and resinous substances. Fragrant, as of flowers and perfumes. Ambrosial, typified by amber, musk and bodily odours. Garlic, as found in onions, garlic, sulphur. Burning, roasted coffee, tobacco, smoke benzol, plenol. Goat, typical of this animal, by caproic or caprylic acid found in the sweat. Repulsive, given off by many narcotic plants or acanthus. Nauseous, or fetid odours from certain plants and from the products of putrefaction.

It might be of interest to note that the sense of smell was located in the upper part of the nasal cavity and covered a small area in either nostril. Odorous substances, to be perceived, must be in gaseous form; the gas entered into solution on the moist surface of the olfactory membrane and acted chemically on the sensitive hairs of the sense cells.

Many odours were certainly objectionable but whether they were harmful it was impossible to say with our present knowledge. Experiments appeared to indicate that odours caused a constriction of the blood vessels in the skin and that in all probability they did affect the blood-supply to the brain.

For the purpose of the Synthetic Air Chart, diluted solutions of varying strength of butyric acid were used to compare the strength of the odour. Six tubes were commonly used, the first containing fine drops and termed 75 per cent. solution. The last contained distilled water and was termed 100 per cent. solution.

Regarding the very controversial question—Natural versus Mechanical ventilation—the lecturer said he could not do better than quote from Dr. Hill Robertson's Report to the Chicago Department of Health, dated 1919:—"In making tests of air conditions in any given room, it was essential, above all things, that a proper standard of measurement or comparison be employed in order that the result be of real value."

If they wished to determine the purity of a sample of water, the accuracy of a watch, or the speed of a locomotive, they must have something with which to measure it, some standard of excellence for comparison, in order that the mind might grasp the true significance of the test. It was due to the absence of such a standard in ventilation work in the past that much diversity of opinion had prevailed.

It was not unusual to hear well-informed individuals condemn mechanical ventilation *per se*, and to insist upon natural ventilation methods, when the latter were totally inadequate to maintain the air conditions required. On the other hand, not infrequently mechanical equipments were specified, and installed where they were unnecessary and undesirable, and where perfectly satisfactory conditions could be maintained by the use of windows or other natural methods at a much lower cost and more economical maintenance.

Natural methods of ventilation might be successful if applied to some classes of buildings when the period of occupancy was short, the ratio of window area to floor area large, the proportion of occupants to cubic space small, and a clean, fresh air supply, free from dust, odours, and other objectionable features could be taken in through the external walls without difficulty. The first step after the open window was probably the roof extractor, and this might be of the fixed or rotary type, fitted with wind vanes. In a report by the U.S.A. Bureau of Standards on some fifty 16 in. ventilators, the conclusion was reached that no general statement could be made as to the relative merits of rotary and stationary or mushroom type stationary ventilators. The performance entirely depended on the particular models.

The next step was probably the ventilating radiator, in which provision was made for the circulation of outside air through a so-called radiator (which was really a convector) of the flue type, placed directly in the occupied space and connected to the outside air by a suitable air duct.

Very few grids had an effective area exceeding 50 per cent. of the gross area obtained by multiplying gross length and gross width. Velocities through the cold air duct seldom exceeded 4 ft. per second or 240 ft. per minute. The disadvantages of a system of this type were obvious, i.e., dust and dirt collected behind the radiators, risk of forcing and cracking the radiator, air supply might not be satisfactory; variation in operation due to the effect of wind, and the difficulty of providing adequate means for moistening the air.

The lecturer, after dealing with several other points, was accorded a vote of thanks, proposed by Mr. T. P. Bennett, F.R.I.B.A.

Department of Overseas Trade.

The Commercial Counsellor to the British Legation, who will be returning to China early in November, will be in attendance at the Department of Overseas Trade from October 20 to October 31 inclusive, for the purpose of interviewing British manufacturers and merchants interested in export trade to China. Such interviews will only be given by appointment and all applications, quoting the reference 5494/T.G., should be addressed to the Comptroller-General, Department of Overseas Trade, 35, Old Queen-street, Westminster, S.W.1.

ELECTRIC HEATING

WITH SPECIAL REFERENCE TO CHURCH HEATING

THE electric heating of large buildings is a subject that usually receives but scant consideration; more often than not, none at all. The belief that electricity for this purpose is so costly as to be quite out of the question is so universal and, apparently, even on the most cursory examination, so well founded that it requires no little temerity to challenge it. But without going to extremes, it may be safely said that electric heating, due to certain characteristics, can and naturally does in many cases, compete commercially with heating by solid and gaseous fuels. Electricity is to-day actually being used for heating theatres, cinemas, churches, schools and dwelling houses.

The one factor that makes it possible for electric heating to be commercially applied to such purposes as these is that the heat can be delivered exactly at the spot where it is required and to the exact amount necessary. If in any part of a room or building a certain quantity of heat is required for warming purposes, all that is needed is to install an electric heater of the necessary capacity. When heat is needed a touch of the switch produces it; when no longer wanted another touch on the switch and the heat supply is cut off. By suitable switch control any required regulation of the heat supply can be secured. There is no unnecessary waste, and when the bill for electricity comes to be settled one pays only for heat usefully employed; incidental expenses are confined to maintenance and repairs, which are usually quite moderate.

The method of applying electric heat varies according to the purpose for which it is required. It may be applied by radiation, convection or conduction. In dwelling houses, occasional, or intermittent, heating is the sphere in which electric heating shows to greatest advantage. Rooms that are only used now and then at most for an hour or two at a time can be heated with advantage by portable electric radiators, which can be carried from room to room and switched on and off just as required. In bedrooms where artificial heating is normally only desired for about half an hour in the morning and evening it is particularly convenient and economical. A well designed electric radiator gives out at least 80 per cent. of its heat as radiation and the comforting effect of this form of heat is experienced almost immediately the radiator is switched on, and there is no need to wait until the whole of the room is warmed before the comfort of artificial heating is obtained. In large mansions an excellent combination can be effected by utilising a solid or gaseous fired central heating installation to maintain a general temperature throughout the building of 55 deg. F.—60 deg. F., electric radiators being used to top-up the temperature to any degree required to meet the varying conditions from day to day. It is, however, self-evident that every heating proposition will have its own special conditions, and it is essential to consider these when planning the application of electric heat. Let us illustrate this by reference to a special problem—church heating.

Church heating is a difficult proposition at any time, and at first sight electric heating for this purpose might appear quite impossible. Probably, in the ordinary way, it would be dismissed without serious consideration. But so far from being an impossible proposition there are definite factors favouring the use of electricity for this purpose. First the character of the demand from the electricity supply point of view is good. The maximum load occurs on Sundays when most of the generating plant is usually idle; the amount of energy required is large; the demand is not of a highly fluctuating nature, and is continuous over long periods; and most important of all, possibly, it does not overlap the peak, or time of maximum demand on the generating station, to any considerable extent. Consequently, it is possible for the supply undertaking to sell electricity at a profit, for such a purpose as church heating, at a very low rate. A half-penny or three-farthings a unit would quite probably be adequate and, in fact, rates as low as this are actually obtainable in a number of supply areas to-day. Naturally this factor has an important bearing on the cost of heating by electricity.

The greatest advantage of electricity, however, is the method of its application. It delivers just the right amount of heat exactly where it is required without unnecessary waste. The object of church heating is to provide comfortable conditions for the congregation during the service, and to fulfil this purpose artificial heat must be distributed uniformly throughout every part. A system that has received the hall-mark of success in practical application is the provision of electric foot warmers to every seat in the building. Every individual in the congregation then has his or her own supply of artificial heat. Conditions of comfort are at a maximum, warm feet being essential in this connection. By suitably proportioning the loading of the foot warmers over or under heating is avoided. Separate foot warmers are not actually provided for each individual, but run continuously the full length of the pew. Aisles, vestibules, vestry, the choir, and other parts of the church, each have their own heating installation. (There is economy here in respect of choir practice, vestry meetings, &c., when only partial heating of the church is required.) Fully to meet the heating requirements the provision of electric heaters under every pew is not sufficient. Down draught from the windows has to be avoided, and this is done by installing electric heaters of suitable loading close up under the windows. Other special features are similarly met by direct application of heat at the point where it is required.

Consider an electric heating installation on the above lines in practical use. The heating ability of the equipment would be sufficient to meet the severest conditions experienced during the year. The installation having been designed with this in view when the conditions are less severe the actual heating requirements at any time are met by suitably operating the switch controls. Much heat is necessary to warm a stone church after it has been standing empty all the week. It is necessary therefore to switch on many hours before the service is due to start, maybe some time during the preceding night. An electric time switch previously adjusted can be utilised for this purpose. Regulation of the heating can be effected at any time by suitably manipulating the switch control, and there is very little time lag in respect of the reduction or increase of heat after the controls have been operated. This permits advantage being taken of the natural heating effect of the assembled congregation for the purpose of economising electrical energy consumption.

It is not suggested that the subject of church heating electrically has in any way been exhausted by these remarks. Enough has been said, it is hoped, to indicate some of the reasons why electricity can be utilised commercially for church heating. It has been done, and has proved very satisfactory and economical in many cases. Owing to the exact nature of electricity it is possible to determine in advance what the approximate cost of heating in a year will be with a reasonable degree of accuracy. In at least one case the maximum annual cost involved by electrically heating a church has been the subject of a guarantee.

COUNTRY HOUSE PLANT

COUNTRY house lighting and power plants vary in size from the smallest units of ½ to ¾ kw. capacity, suitable for lighting bungalows and small houses, to plants of 25 h.p. or more, necessary to meet the lighting and power requirements of large mansions. The former are invariably petrol-engine driven units, while for the latter heavy oil or gas engines are the general rule. Between these two extremes there exists great variety in respect of size, type, and choice of prime mover.

With very few exceptions a storage battery constitutes an essential part of the equipment, and this determines the nature of the supply as direct current. The voltage, or pressure at which electrical energy is generated is an important consideration. In the case of plants intended to supply only the lighting requirements of small houses a pressure as low as 25 volts may be adopted with advantage. The chief advantage associated with high pressures is that they allow of thinner wires being used for the purpose of supplying a given load, which results in economy on the initial outlay. In the case of bungalows and small isolated houses the lighting load of itself would be quite small and thin wires would, therefore, be used in the ordinary way. Generally in these circumstances 25 volts will represent the most economical pressure. There are, however, disadvantages, the chief of which, perhaps, is that as the battery voltage varies during discharge the intensity of the lighting will also fluctuate. Though this effect is negligible at the higher pressures usually employed, it may become appreciable and annoying at a pressure of only 25 volts. Further, 25-volt lamps are in the nature of special types, while if at any time it is desired to use an electric iron or other domestic device, such appliance must be specially designed for this pressure; normal stock sizes could not be used. Generally then such low pressures are not to be recommended except for the smallest installations.

Many country house plants have been installed for a 50-volt supply, but though this offers some economy in initial cost there is a good deal to be said in favour of 100 volts. The latter is a standard public supply pressure, and lamps, irons, kettles and similar small appliances for this voltage are stock articles. Also the possibility of a public supply becoming available in the district should not be overlooked as it would generally in such an event be economical to take advantage of it. If the original installation is designed for 100 volts pressure little or no alteration would probably be needed to adapt it to connect to the public mains. Depending upon the actual supply voltage and nature of the supply, d.c. or a.c., lamps and other current consuming appliances might or might not have to be changed. These factors need to be taken into consideration when determining the voltage of a country house installation. In some cases, such as large installations where there are long runs of cable or

where the generating plant is situated a considerable distance from the house, a pressure of 200 volts is quite likely to be the most economical. This again is a standard public supply pressure and, the installation being large and the cable-runs long, the use of thin wires would be a factor of economic importance. It is not possible to give any definite ruling as to the best voltage for any size of installation, as local conditions enter into the matter to a considerable extent. Where, however, 25 volts is too low the factors favouring 100 volts or 200 volts should be carefully weighed.

The battery is a most important part of the equipment, but, adequately to deal with, it would occupy too much space. It is advisable, however, always to instal a battery of ample size, and it is safest to confine one's choice to the products of manufacturers of repute. Cheeseparing in respect of the outlay on the battery is generally unwise economy. A large battery worked well within its capacity will obviate much trouble, and will save expense in maintenance and renewals. A safe standard would be to instal a battery of such size that the work imposed on it will not wear out the plates under a period of ten years.

Small and medium-size generating sets up to several kilowatts employing petrol, or paraffin engines for the prime movers are available in three types, viz., automatic, semi-automatic, and non-automatic or manual operated. The completely automatic plant is arranged to start up when the load exceeds a predetermined value, and to shut down when the load falls off again without human intervention. Such units will give very satisfactory service so long as everything is all right, but there is the drawback that in the event of a fault developing skilled attention is usually required and will probably not be immediately available. The semi-automatic set which is started up by hand to charge the battery and shuts down of its own accord when the battery is fully charged is more widely used. In either case it is desirable that the automatic switchgear be as simple and reliable as it is possible to make it. Hand-operated plants are controlled throughout by the plant attendant. Skilled attention is not involved, however, as the simplicity of these sets is such that they can be left to the care of the gardener, or odd-job man, after a little instruction in their manipulation.

There is a large variety of plants of each of the above three types available, and they differ widely in respect of price. It has already been indicated that voltage and the size of battery used are two important factors affecting cost. A third is the speed at which the sets operate. Generally speaking, very high speeds allow of cheaper manufacture and, it may be added, involve greater wear and tear. But it must not be overlooked that both petrol engines and electric generators are established as reliable high-speed machines. The general tendency in American practice is to favour high speeds up to several thousand revolutions per minute, and in British practice relatively low speeds.

For medium-size plants up to, say, 10 h.p. very satisfactory service can be obtained from gas or oil-engine driven sets. The former almost presupposes the existence of an available town gas supply, as otherwise suction gas plant would be necessary, when the oil engine may be taken as the better proposition. Where a large plant is in question and skilled attention is available, however, it must be admitted that a suction gas plant gives satisfactory and economical service. Oil engines may be either of the horizontal or vertical types, and either of slow (a few hundred revolutions per minute) or comparatively high speed. The former naturally occupies greater space, but a horizontal type oil-engine direct coupled to a slow-speed generator undoubtedly represents a very sound combination likely to involve little trouble in repairs and maintenance. Belt drive to a relatively high-speed generator enables economy in initial outlay to be effected—high-speed generators being cheaper to manufacture—and this generally does not complicate matters to any appreciable extent. There are a number of relatively slow speed vertical oil engines, including types running on paraffin, of reliable make available, and these would naturally be favoured where space is limited. With vertical-type engines also direct or belt drive may be employed.

As the capacity of the plant increases, it becomes more and more important to make provision for putting the plant in operation by other means than hand-starting. The usual method is to run the generator as a motor, taking power from the battery until it is up to speed, when the engine comes into action. This, of course, is what is done with automatic sets and is, in fact, quite a common feature with all types of unit as small as one kilowatt capacity or less owing to its great convenience. It involves only quite a simple switching problem.

For large installations up to and exceeding 25 h.p. the choice of prime movers is widened to include heavy crude oil engines, semi-Diesels, and suction gas plants. Usually in such cases skilled attention would be available, and satisfactory and economical operation would be influenced to a greater extent by the human factor.

Finally, a word as to water power. There are undoubtedly quite a large number of small streams in this country now running to waste which could be usefully and economically harnessed to develop electrical energy for the lighting and power requirements of country mansions, villages, and even small townships. It is surprising and regrettable that greater advantage has not hitherto been taken of the opportunities for cheap generation which many streams offer. The subject of water power development is a very wide one and cannot now be discussed, but it is urged that the possibilities of utilising this source of energy should never be overlooked or neglected.

WIRING SYSTEMS

IN recent years the number of wiring systems has multiplied to an almost phenomenal extent. So much so, in fact, that to-day there is an undoubted embarrassment of choice. Correctly to differentiate between the special technical features of the various systems and to select one that will best meet the requirements in any particular case is specialists' work pure and simple. It is not to be undertaken without sound knowledge and wide experience; it is a function fulfilled by the electrical consulting engineer. We do not wish to be misunderstood to say that there is one best system for every job. Actually there may be half-a-dozen or more different systems, with any of which it might be possible to carry out a first-class installation in a given case. In dwelling-houses, for instance, almost any system, in the hand of a conscientious contractor and skilled workman, would give satisfactory results. On the other hand, there may be one system particularly well adapted to the special conditions of a certain installation, and therefor the best for that case. It is not always technical features that decide the choice of system. Inconspicuousness, ease of installation without damage to existing decorative or structural details, cost, and so forth, may be the determining factors. All of which remarks only go to emphasise what has been stated, that electrical installation involves specialist work, and that co-operation between the architect and the electrical engineer is essential if the best results are to be secured. Having made this point clear, we may proceed with the main purpose of this article—to present a general review of the various classes of wiring now in vogue.

Wood casing was one of the earliest systems developed, and was extensively used. It consists essentially of vulcanised rubber-insulated wires laid in grooved wood casing to which plain or ornamental wood capping was screwed, to enclose and protect the wires. Generally, the casing was run on the surface and, compared to modern surface wiring systems, was bulky and unsightly. For dry situations it constitutes a very satisfactory and quite cheap system, and it represented standard wiring practice for many years. It is to be avoided in damp situations or buildings where vermin are likely to be present. In certain respects wood casing has points of superiority over all other systems, but its two great drawbacks are its inflammable nature and inability to resist damp. The need for greater protection against mechanical damage, the chance nail, and fire, however, led to the advent of the conduit system.

Conduit Installations replaced wood casing as the standard form of wiring, more particularly for new building work, where the position of lights, switches, etc., can be determined prior to construction. In one form or another it is the most widely used system to-day. Enamelled tube conduit, the various sections of which are connected together with coupling pieces, entirely surrounds the vulcanised rubber wires, which are usually drawn into the conduit after the latter has been fixed in position. In effect, the whole of the wiring is metallically encased in every part of the installation. It is very important that the whole of the conduit be electrically continuous throughout, and that at one point it should be effectively connected to earth, as this provides a large measure of safety in the event of electrical breakdown. Failure of the insulation will allow electricity to pass from the conductor to the conduit, which then becomes electrically alive. If the conduit is electrically continuous throughout, the resistance to the flow of current to earth will be low, which will allow a sufficiently large current to pass to blow the fuse of the particular circuit on which the fault happens to be. The faulty circuit will then be rendered dead, and the risk of electrical shock, fire, etc., eliminated. If the resistance in the path of the current flowing to earth is high—due to the conduit not being properly continuous—much damage may be done by stray currents before the fault is finally located. There is also the risk of shock to anyone touching a live section of conduit. Both slip couplings and screwed couplings are used for connecting the sections of conduit together, the latter being obviously preferable from the point of view of securing good continuity. When slip couplings are used some form of continuity grip device is necessary at every joint, and this, naturally, does not lend itself to such high-class work as screwed steel conduit. There are several types of conduit. It may be solid drawn, brazed, welded, or simply split tube. Solid drawn steel conduit with screwed couplings represents the highest standard of quality. Owing to its cheapness and ease of erection, split tube conduit with slip-on couplings has enjoyed a wide popularity. Excellent mechanical and electrical protection and practical elimination of fire risk are characteristic of conduit wiring properly carried out; where the wires are drawn in after the conduit is fixed the system lends itself to

the easy replacement of faulty or perished cables.

The demand for cheapness, simplicity and efficiency in electrical installation work has led to the introduction of a number of patent wiring systems. The post-war conditions naturally tended to accelerate this phase of development, with the result that to-day there is a wide choice. Broadly, these systems may be classed as surface wiring systems and sub-divided into two groups, depending on the type of cables used, viz., metal-sheathed and cab-tyre or tough-rubber sheathed. Though classed as surface wiring systems, they can, of course, be run concealed where necessary or desirable; an installation is frequently partly concealed and partly run on the surface. Practically all these systems seek to secure the same advantages, and their general characteristics are, up to a point, similar, more or less. It is proposed to give some idea of the nature and purpose of surface wiring systems, without going into details of any particular system.

Metal-sheathed surface wiring systems make use of special cables and fittings. The copper conductors are insulated with vulcanised rubber, over which proofed tape is wound. One, two, or three such cores are then sheathed either with a lead alloy of special composition, which is put on under heavy hydraulic pressure, or other metal covering. For identification purposes, and to facilitate connecting up, the tapes wound round the individual cores are distinctively coloured. Single-core cables are circular, and twin and three-core of flat cross section. In this type of cable the overall diameter is kept to a minimum, so that even when run on the wall or ceiling surface it does not constitute a disfigurement such as would be likely to result if ½-in. or ¾-in. conduit were utilised in the same way. By suitably selecting the cable runs—up door mouldings, round picture rails, etc.—the cables can be installed in such a way as to be largely invisible to casual observation. For fixing the cables in position, neat thin metal holding clips are used at short intervals throughout the run. When erecting, these clips are first fixed in position to the walls or other convenient support by means of pins, screws or dowels. The cables are then placed in position and the clips only have to be bent over in the right way to hold the cable firmly in position. It will be readily appreciated that cables of this type, fitted in the manner described, involve the minimum of damage to existing decorations, very little or no cutting away and making good is necessary, and since the work of erection is very simple, time and expense in installation are saved. Further, the semi-flexible character of the cables allows of their being bent round corners, adjusted to cornice curves, etc., with ease. Where the cables are run in positions exposed to mechanical damage, additional protection may be afforded by steel channel sections or such-like methods. Steel channel sections are also used in some cases to support the cables carried across the ceiling, with the object of avoiding unsightly sagging between points where the cable is supported. The same characteristics of neat appearance and simplicity are aimed at in the design of the accessories, such as junction boxes, earthing devices, etc., which are necessary to complete an installation. A common form of junction box consists of a thin metal backplate fixed in the required position by a single screw, and a similar cover either fixed to the backplate by a screw or arranged simply to clip on. Jointing of wires within the box is commonly effected by means of simple porcelain-sheathed connectors. Provision is usually made to allow cables to be brought into the box at any position, thus securing complete flexibility in this respect. While the lead, or other, sheathing of the cable ensures excellent electrical continuity throughout any one run, long or small, special provision must be made for bonding at all junction points. This bonding is a point that needs special attention in any metal-sheathed surface wiring system. In some cases the junction box itself is utilised as a bonding link, in others special bonding clamps of simple designs, easily fixed, are employed. The earthing bond is also an important feature.

From this brief description some idea may be obtained of the general characteristic of metal-sheathed wiring systems, and also the advantages they possess in respect of cheap, simple and inconspicuous installation. The actual design of the accessories is the chief feature of difference between individual makes. Such systems are widely used to-day and are increasing in popularity as their intrinsic merits become better known.

Cab-tyre-sheathed and tough-rubber covered wiring systems are similar in general principle to the metal-sheathed variety, but a covering of tough rubber compound similar to that used for tyres of cabs replaces the metal sheathing. This covering possesses extraordinary resisting properties to rough treatment, and is unaffected by being exposed to paint, moisture, wet plaster, acid and chemical fumes, and such-like corrosive atmospheres. The cab-tyre cables are secured to walls by clips in a manner similar to that described when run on the surface. In common with metal-sheathed cables, they may be buried in plaster or brickwork, or run concealed. They possess the maximum of flexibility, and in addition to being widely used for all ordinary installation work, are particularly well suited, in conjunction with corrosion-proof accessories, to such situations as chemical factories, breweries and the like. As indicating the wearing properties of cab-tyre-sheathed cables, it may be mentioned that they are used with much success for hand-lamps, portable drills, and similar tools in factories.

Some patent wiring systems make special provision, by means of coloured exterior braiding over the lead-sheathing or by neat wood beading which may be stained and polished, so that the installation may be made to harmonise with any existing scheme of decoration. Very neat and inconspicuous work is thereby made possible.

GAS CONFERENCE.

MR. H. WADE DEACON, presiding at the closing session of the British Commercial Gas Association Conference, at Liverpool, said that the churches should take the lead in attempting to bring employers and employed together, with a view to setting up machinery for the prevention of strikes and lock-outs.

The Bishop of Liverpool welcomed the suggestion, and expressed the hope that "Copec" might be the means of giving it practical effect. It would, he said, take a generation or two to make good the mistake of the old economists of treating the labour of men on a level with dead material things. Completely human relations in industry would be attained when all who contributed labour of brain and hand, as leaders or led, understood not only their individual contribution as part of a great whole, but understood each other. He expressed his warm approval of co-partnership, which was in extensive operation in the gas industry. The Bishop commended the enterprise of the Association in the education of adult workers, and expressed the hope that part-time continuation schools would become universal, and that they would develop on the lines of public schools for the masses.

Mr. Wade Deacon, in thanking the Bishop, said proposals had been made that there should be a truce in the industrial world. If there were to be a truce, there must be some organisation which would settle matters of wages and conditions without strikes and lock-outs. He suggested that the Church might take some action in this matter. It would be a blessing to the country if the leaders of the Churches—Anglican and Roman Catholic and Free—could bring about a conference between the unions and the employers. Unless something were done to stop the strife in industry, the country would be in a very dangerous position in a few years. Although some people deliberately fermented trouble, the great majority of employers and employed were reasonable, sensible, and honest men.

Sir Lawrence Weaver, speaking on "Art in Industry," contended that industry, as the great source of wealth, had a very substantial duty to support the fine arts as well as the applied arts. Such great buildings as Liverpool Cathedral had to be financed ultimately by industry. When they considered the devastating blight of ugliness which the industrial developments of the nineteenth century laid upon this land, the public had the right to demand something in return from the industrialists who had now learnt better things. A community got the measure of ugliness in common life that it deserved, just as it got the government it deserved. Industrial people had got to support the artist, otherwise beauty would die out of the world. The Commercial Gas Association had a clean record in that matter because they had encouraged art in their publicity campaigns. The only really entirely satisfactory piece of commercial publicity at Wembley was the gas exhibit, because it was the only piece of publicity which had entirely suppressed the individual and had simply set out to make a fair, beautiful, and persuasive picture of an industry.

Sir Lawrence went on to plead for seemliness in common things and for the kind of art that everybody could understand. Real art was no more costly than ugliness. Art was not a coating applied to things normally base and ugly; it was a character in things and not something stuck on the outside. There was no reason why all the things they employed in industry should not be seemly, decent, and pleasing.

Mr. Lawrence D. Holt, in proposing a vote of thanks to Sir Lawrence Weaver, said they must unite to fight the smoke fiend, even if they had to put themselves under a penalty. As a shipowner, he regretted that the shipowners had asked Parliament to exclude ships from the ambit of the new Smoke Abatement Bill. The reason given was that they could not impose these domestic laws on foreign ships without causing irritation. Mr. Holt contended that all the new houses which were being built by municipalities should be smokeless houses.

The Chadwick Lectures.

The Chadwick Lecture Programme for this autumn includes lectures in London on "Defective Hygiene and Child-Life," with special reference to the effect produced on growth and development of children by town dwelling and slum areas, by Dr. Lawson Dick, M.D.; "Rats," by Dr. Mark Hovell, F.R.C.S.; "Smoke," with a review of its causes, its effects on vegetation, fabrics, masonry, and metal work, and its influence on health and the death-rate, by Professor J. D. Cohen, Ph.D.; and "Ante-Natal and Post-Natal Child Physiology and Hygiene," by Dr. W. M. Feldman, M.D. Each lecture will be illustrated and among the chairmen will be Sir William Collins, Chairman of the Chadwick Trustees, Sir J. Crichton Browne and Sir Frank Baines. Further information about these lectures, which will be free to the public, may be obtained of the Secretary, Mrs. Aubrey Richardson, at the offices of the Trust, 13, Great George-street, Westminster.

ARCHITECTS' AND BUILDERS' INQUIRY BUREAU

*** We are glad to give questions and answers but cannot accept responsibility for contributed replies, especially on legal matters.*

May we appeal to our correspondents to submit their queries on paper of a size easily filed, and written as legibly as possible, or better still, in typescript?—ED.

Abandoned Work.

SIR,—Can you inform me whether an architect and quantity surveyor can claim the full fees for quantities upon abandoned work, in a district where it is the general practice to prepare them, if he has not actually obtained the client's instructions to prepare them, but merely to obtain tenders. If one could forsee differences of opinion, one would naturally enter into the matter in detail at the outset, but so many jobs go through without question that it becomes a habit to assume that the general public is familiar with the methods of local practice. "BITTEN."

Size of Bricks.

SIR,—I have noticed of late that many of the bricks in this part of the Midlands are slightly thicker than those obtaining before the war. The difference is very slight, amounting to little more than ¼ in. in seven courses. The opinion has been expressed in my hearing that it is due to the urgent pressure on the brick-making industry leading to rather less burning than of old. Is there anything in this suggestion, and, if so, is the quality of the brick likely seriously to suffer in consequence?

"GAUGE."

Incinerators.

SIR,—As a reader of your paper, I am taking the liberty of writing to you to see if you can help me in the matter of building an incinerator suitable for the burning of refuse from a sanatorium. They would like me to build one in an open field where there is no chance of obtaining any forced draught, and they will not go to the expense of a chimney-stack. The amount of refuse to be burnt is about three dust-bins a day, and is of a green wet nature. I thought perhaps one of your readers might know the type that proved best in the Army. JOHN GABBERTAS.

Raising of Party Wall.

SIR,—For some years before the war I was an architect and qualified as A.R.I.B.A. in 1912, and was a constant reader of *The Builder*. I am now in a difficulty regarding a question of the raising of a party wall and would be grateful if you would help me with your opinion. I am the owner of shop premises and I wish to carry out extensions at the rear of same. My neighbours have a tenement at the rear of their premises with a rain-water gutter overhanging my yard, but emptying into their yard, as per sketch (No. 1). This gutter has been in existence many years and is possibly a "right." Their tenement roof is in a very bad condition, having been grouted frequently with cement and tar, but is apparently water-tight.

Query (1) My neighbours demand that if we raise the dividing wall (which they agree is a party wall), necessitating disturbing the eaves of the tenement roof, we must re-slate the whole of both slopes of the roof and, if necessary, provide new rafters, battens, &c.; in fact, provide a new roof in place of the old one. Is this a legal demand? Is it not legally the case that we must only replace in a workmanlike manner and make water-tight the actual part of the roof which we disturb—in this case the slating at the eaves, and provide, of course, a lead gutter against the raised portion of the wall?

Query (2) If it is considered the overhanging gutter is now a "right" have my neighbours the "right" also to demand access to the gutter from my yard? or can I build a wall past the gutter (as per sketch No. 2), which would entail any attention to the gutter being given from their roof?

Query (3) My neighbours also demand that the party wall shall be raised full thickness and shall still be a party wall when completed. Have I not the right to build up for only half the thickness on my side—the raised portion being my property and not a party wall?

Query (4) Can I carry out my intention of removing the gutter and raising the party wall for half its thickness without agreeing to the unreasonable conditions imposed by my neighbours? J. B.

Estimating Quantities.

SIR,—In estimating the quantities of bricks, breeze slabs, roof tiles, flooring, and other building materials in bulk for ordering purposes, can you inform me what allowance in each case is usually made for breakages, waste in fixing, &c., over nett superficial measurements as given in Bill of Quantities?

"QUANTITY SURVEYOR."

Brands of Timber.

[Messrs. *The Timber Trades Journal* inform us that for a number of years they have been publishing a book entitled "Shipping Marks on Timber," which should be of help to "Cautious." The latest edition is out of print, but a new edition is in course of compilation.]

Grano-paving.

[REPLY TO STUDENT.]

SIR,—The operations of beating up cement after it has once set, and of scouring the surface of granolithic cement under like circumstances, are not quite parallel. In the first case the re-used cement mortar is handled as though freshly made, and having passed through a chemical action, its efficiency is destroyed.

The purpose of scouring the surface of granolithic cement, on the other hand, is twofold—(1) to acquire thorough homogeneity through pressure, which would be impossible by hand trowelling over a fluid surface, and (2) to produce an extremely fine surface, which can be produced the better upon a mass as it approaches solidity, just as it is the harder stone that takes the better polish.

It is not a question of beating up the whole bulk of the paving, but merely a surface treatment.

"INTERESTED."

Rough Cast.

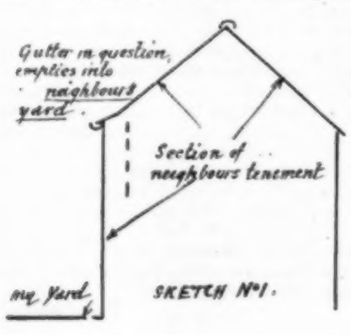
SIR,—Can any of your readers give a good recipe for cement and granite rough cast? It is desired to avoid the drab grey Portland cement tone, and the result aimed at is a cool grey colour in which the sparkle of granite particles is a little in evidence.

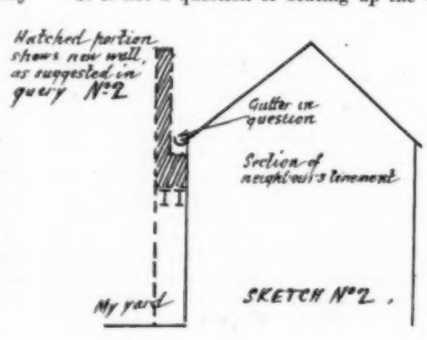
"STUCCO."

Building Paper.

SIR,—Can any of your readers inform me through your columns as to the makers of Building Paper Pioneer No. 1, or equal? If necessary, we shall be glad to forward samples of what we require.

"CONTRACTOR."




Hatched portion shows new wall, as suggested in query No 2
Gutter in question
Section of neighbour's tenement
My yard
SKETCH No 2.

THE WEEK IN PARLIAMENT

WESTMINSTER, *Wednesday.*

PARLIAMENT reassembled on Tuesday, September 30, to pass the Irish Boundary Commission Bill.

Rent Restriction.

Mr. N. McLean asked whether it was the intention of the Government to introduce legislation to bring the rents of pre-war houses to pre-war level?

Mr. Clynes said that the whole question of Rent Restriction was receiving the consideration of the Government as an urgent matter.

Mr. D. G. Somerville: Will the right hon. gentleman try to introduce legislation to bring the cost of repairs back to what they were in 1914?

Mr. Clynes: That is a subject which could not be considered without the matter covered by the first question being fully dealt with.

Local Authorities and the New Act.

Mr. Wheatley informed Mr. Stranger that since the Housing (Financial Provisions) Act was passed on August 7 last, most local authorities had been in recess, and there had not been sufficient time for local authorities to formulate completely their proposals under the new Act. Local authorities had been requested to frame their policy so as to provide for continuous house building, and, in addition to submitting proposals for immediate building, to adopt programmes for work which they would be able to carry out effectively during the next two years. He would be glad to give the House from time to time as complete information as possible.

Number of Apprentices.

Mr. E. Simon asked the Minister of Health whether he had taken the necessary steps to have a return made at regular intervals of the number of apprentices in the building trade; and whether he would arrange for such returns to be published at intervals of not more than a month?

Mr. Wheatley said that steps were being taken to set up the Industrial Committees which he had foreshadowed in connection with the housing scheme and, as part of the arrangements, he hoped to provide for the periodical supply of statistics as to the numbers of apprentices.

Rebuilding in France.

A book, entitled "Five Years of Effort," has recently been issued by the once devastated areas of France. Among other things it states that of the 22,900 industrial buildings destroyed, no fewer than 20,872 have been reconstructed. Of 200 pits destroyed, 145 are now working. Of the 742,000 houses and agricultural buildings destroyed, 605,000 have been rebuilt.

THE BUILDING TRADE

NEW METHODS OF COTTAGE CONSTRUCTION

In order to get a large number of small houses built in a short period of time a great deal of attention is now being given to new materials and new methods of building. The position now is much the same as it was when the first post-war Government housing scheme was launched: the need for houses has not diminished; the number of skilled men available has not increased; there are still not enough bricks being manufactured at present to meet the requirements of such a big programme. Since the "Addison" scheme was abandoned owing to the height to which the cost of building had soared various causes, perhaps the chief of which is the absence of demand, have led to the price of a working-class dwelling being reduced from the top figure of over £1,000 to somewhere about £500, and it is probably the fear that prices will again increase when the new scheme is put in operation, and the demand again far exceeds the capacity of the industry so far as materials and skilled labour is concerned, which is responsible for the anxiety of the Government to discover alternative means of providing cottages.

Of the new materials advocated steel is at present receiving the most attention. We have not yet had an opportunity of seeing one of these houses, and without further particulars than the meagre information which has been published it is impossible to give an opinion on them, but a proposition put forward by Lord Weir deserves close attention. So far as we can gather the houses are built of timber frame covered on the outside with steel plates and with wallboarding and bituminous paper inside; chimneys are of reinforced concrete, and the roof of asbestos-cement on wood rafters. No doubt such houses could be erected very rapidly, providing they are not built in such large numbers that the steelworks cannot keep pace with the demand, in which case the steel house would be as difficult to obtain as is the brick house, but it is probable that the manufacture of the units would have to be on such mass-production lines that the resulting standardisation would not be acceptable to most people.

The only other material being advocated to any extent is concrete. Many thousands of houses have already been built with this material, with the walling either monolithic of in the form of piers-and-panels or hollow or solid blocks. The chief advantages of this material are that suitable sand and coarse aggregate may be found in practically every district, and often on the housing site itself, thus avoiding delay in obtaining materials and transport charges, and that local labour at present receiving unemployment pay or other forms of relief can be quickly trained to build in concrete, but as to cost the saving on the walling does not often exceed 10 per cent. on the total cost of the house.

A few years ago there were some two hundred different systems of concrete construction being advocated, and most of these were approved by the Ministry of Health; not more than a dozen or so, however, were used for building cottages to any extent, and now, as a result of experience, many of these systems have been abandoned. The systems which have survived may be divided into three distinct classes, namely, walls poured *in situ*, piers erected at intervals around the building and filled in with slabs, and either plain rectangular blocks forming a wall in two leaves with a cavity between them or hollow blocks the full thickness of the wall. In the first housing scheme blocks in one form or another were used almost exclusively; later, the pier-and-panel system was extensively used; monolithic walls were used in but very few districts. It seems now, however, that the order in which these methods find favour has been altered, and in schemes now in course of erection the pier-and-panel system is probably being more extensively used than blocks; concrete cottages with monolithic walls are still not being built to any great extent.

One of the chief causes of the diminution in the use of concrete blocks for large schemes is no doubt the extra cost entailed by the trade union rule which requires that the laying of concrete blocks comes under the heading of bricklaying, and that bricklayers must be employed for the work, while there is also a considerable amount of unskilled labour required for the manufacture of the blocks, carrying them away from the machines in which they are made, keeping them watered while they are curing, and carrying them back to where they are wanted for erection. This can be eliminated by purchasing the blocks already made and cured in a factory, but as factories for the manufacture of concrete blocks on a large scale are not in many parts of the country conveniently situated the cost of transporting the blocks would, in many cases, make this a more expensive procedure than making them on the site. However, thousands of cottages have been built of concrete blocks, and in nearly all cases have worked out cheaper than brick.

The pier-and-panel system was designed to eliminate the necessity of employing bricklayers and to simplify manufacture of the units. Concrete piers, usually reinforced, are erected at intervals of about 4 ft. around the building, and the spaces between them filled in with slabs measuring 4 ft. by 2 ft. high by about 3 in. thick. The piers are made with parallel grooves throughout their height on both sides, and in these are slotted tongues cast on the ends of the slabs. A cavity wall is thus formed without mortar joints, the outside being roughcast or rendered to hide the joints and to make them weatherproof. This system may be cheaper because no skilled labour is employed on the walling, and because the plain slabs required are simpler to make than the sometimes complicated forms of hollow blocks, and also because owing to their larger size fewer are wanted, but to get the cheapest building a certain amount of standardisation is necessary; the most economical use of the system is to build all the houses exactly alike, every deviation from the standardised pattern adding to the cost.

Monolithic concrete walling for cottages has not been used to any great extent in this country, although in America it is perhaps the most usual method. The Edison method of pouring whole streets of houses at a time no doubt has considerable possibilities for cheapness; but here, again, the same moulds have to be used over and over again, with the result of monotony and sameness, if it is to be put to its most economical use. This method also involves the use of hoisting and placing plant, as the whole of the houses even to the picture rails are poured from the top, which would not be economical except on very large schemes. Besides the Edison method, however, there are several other systems of monolithic wall construction which could be applied to small house erection by which one house or any number of houses could be erected with a minimum of plant. One of these methods uses sheets of galvanised iron which revolve outwards and upwards from the ground level to the top of the wall, the wall being built in courses about 2 ft. 6 in. deep. Another makes use of a mould about 3 ft. long by 2 ft. deep, so built that it travels along the wall. Another method, and one which seems to have considerable possibilities, uses moving shuttering of the type used for silos; the cost of shuttering is reduced to a minimum, as a piece of timber 15 in. high is all that is necessary to carry a wall to any height, and of a length corresponding with the length of timber. These and other similar methods permit of rapid construction with a minimum of plant, and if a mesh or similar reinforcement is used vertically throughout the wall it is possible for one man to pour a dense impervious concrete for the outside of the wall and another simultaneously to place a breeze concrete to form a porous inside wall. It is claimed that by the use of sliding shuttering the walling of any number of houses can be built in three days at a cost 25 per cent. less than brickwork.

It may be useful to sum up the methods of construction with these three methods of concrete construction:—

Concrete Blocks.—Made in a machine or wooden mould, carried away and kept moist for two weeks or so while curing, then built into the wall (usually bricklayers have to be employed). Size generally 18 in. by 9 in. by 4½ in. when solid blocks are used to form a cavity wall; smaller sizes made to follow the architect's design when necessary. Hollow blocks are usually 18 in. by 9 in. by 9 in., and smaller sizes made when necessary as with solid blocks; the hollows are usually formed so that there is a continuous flow of air throughout the wall. Cavity walls are formed with dense blocks for the outer leaf and breeze blocks for the inner leaf. Hollow blocks are generally made of an impervious concrete throughout, and the air flow through the cavity is often relied on for the prevention of condensation on the inside. Surface either roughcast or left with the blocks and joints exposed; the surface is often relieved by forming the blocks with an imitation rock face or by a ribbed surface; sometimes colour is imparted to the blocks by incorporating a colouring material with the concrete when it is mixed or by the use of coloured cement purchased from the cement manufacturers.

Pier-and-Panel System.—The piers are built *in situ* or pre-cast and erected in position after curing; in either case they are generally reinforced with three or four vertical steel rods. Panels are made on the site, usually in wooden moulds made by the contractor. No skill is required to place the panels in position, as they are simply slotted between the piers and held in position with a tongue and groove joint. In some of the systems no mortar is used. Cavity walls are used, sometimes with impervious concrete on the outside and porous slabs inside. It is necessary to render the outside surface and push the cement well into the joints between the slabs and between the slabs and the piers, in order to make the walls weatherproof. The greatest economy is obtained by a certain amount of standardisation, otherwise it may be necessary to erect piers closer together than is necessary and make the slabs in different sizes.

Monolithic Walls.—Apart from methods where whole streets are cast together, houses may be built with monolithic walls, reinforced or not as desired, without standardisation of design and without a great deal of shuttering. Climbing shuttering, travelling moulds, or moving forms may be in small units, and as no piers intervene window and door openings may be placed in any position without extra cost or cutting formwork to waste. Cavity walls are formed by placing boards or sheets of metal in position within the shuttering, and held apart by distance pieces, before the concrete is poured; as the wall gains in height

this inside shuttering and the distance pieces are raised ready for concreting the upper part of the wall. A vertical dampcourse may be inserted throughout the height of the wall, or a mesh or other reinforcement placed in position and concreted in; when such a dampcourse or mesh reinforcement is used pouring can take place simultaneously from each side of the wall, and a dense concrete used on the outside and a porous mixture on the inside to prevent condensation. Walls built on this system may be roughcast or left as they come from the shuttering. If wooden shuttering is used the surface may be broken by fixing strips of wood or blocking-pieces to the inside of the shuttering. A perfectly flat surface showing no marks of shuttering can be obtained by the use of steel shuttering. There are also many methods of treating concrete surfaces with pleasant effects. The method usually adopted, because it is the cheapest and simplest, is to wash off the film of cement which works up to the surface while the concrete is setting and exposing the aggregate of which it is made. With climbing shuttering, travelling moulds, or moving forms this is a simple matter, as the shuttering is removed from the face before the cement has finally set, and the film can be brushed from the surface with water; if the concrete has set the cement is removed from the surface by acid or by chipping with a hammer. This method of surface treatment opens up wide possibilities, as the colour may vary from white, if a white aggregate such as marble chippings and a white cement are used, to black if black marble chippings are used with a cement coloured black. Marble chippings are, of course, out of the question for cottage building, and are only mentioned to show the range of colours and shades which can be obtained by using different aggregates or combinations of aggregates; when it is remembered that only the aggregate of which the concrete is composed is seen on the surface it will be realised that cottages built of granite aggregate in a granite country will look like granite, and cottages built of concrete with a flint aggregate in a flint country will look like flint.

A number of houses have also been erected with a steel frame filled in with concrete, either poured or in the form of slabs; this system comes within the heading "Pier-and-Panel Systems" above, the only difference being that a certain amount of site work in marking concrete piers and carpenter's work in making roof trusses and floor joists are avoided. Cottages are also being erected with concrete plastered on both sides of mesh reinforcement, no shuttering being used.

From this brief survey it will be seen that the Committee now sitting has much material to work upon in the thousands of cottages which have been built of materials other than brick during the past few years, and as these various methods of building have all been produced within such a short time it is probable that in the course of its investigations other methods will be discovered with even greater possibilities. Obviously 2,500,000 houses cannot be built within the next fifteen years with brick, but in the search for new materials brick will, of course, not be overlooked. Until the outbreak of the war brick was used almost entirely for small house construction, obviously because it was the cheapest and best material then known. Present difficulties are due in large measure to the shortage of bricks and bricklayers, not to anything wrong with the method. We have been told that because they have been in use since the time of the Pharaohs it is time bricks were scrapped in favour of something new, but because a thing has been in use for a long time it does not follow that it is of no use any longer. In fact, the experience with newer forms of cottage building prove that under normal conditions there is no cheaper or better material than brick, for even when no skilled labour whatever is used in the erection of the walling of a cottage and the materials are found locally there is hardly ever more than a saving of 20 per cent. in walling. It is only the present higher wages of the bricklayer and the increased cost of bricks which enable savings to be effected by the use of other materials; it is more than probable that if similar houses were built of brick and one of the new methods under pre-war conditions of wages and prices of materials there would be no saving at all. However, under present conditions there are certainly cheaper methods of building sound, weatherproof, durable, and comfortable houses than by brick, and undoubtedly the new methods will play a large part in the housing programme when it is put in operation. It may be that an effort to increase the output of bricks while the apprentice-bricklayers are being trained under the agreement between the Government and the building industry would make it easier to build many of the new houses in brick, especially in districts near brickmaking centres where transport charges would be low.

Since the above was written, we learn that Mr. Wheatley and the members of the Committee which is considering new methods of cottage building have visited Glasgow and inspected three new systems, namely, Lord Weir's timber and steel cottage, which was erected, under factory conditions, in "three or four hours," and the price of which is given at £300 per house if over 1,000 are built on one site; a house built by Messrs. Beardmore for the Duke of Atholl, which is constructed of outer walls of steel three-eighths of an inch thick and inner walls of asbestos-cement; and a cast-stone cottage, built by Mr. John MacDonald. We learn that the members of the Committee were "greatly impressed" with these experimental houses, but no further technical details of the methods of construction have yet been published.

INDUSTRIAL PEACE ARBITRATION

In the Prime Minister's speech at Derby in connection with the proceedings at Geneva and the League of Nations there was contained this significant passage: "The thing we have to do is to outlaw war. Until the nations of the world discover some particular act which can be taken by universal consent as the test of aggression you will always have war. The Labour Party made its contribution to what that act of aggression by common consent ought to be and it is this—a refusal to submit to arbitration."

That, according to the Prime Minister, is the attitude of the Labour Party to peace in the international sense. Peace at home in industrial matters is hardly less important and this pronouncement of the Prime Minister appears equally applicable to industrial disputes. What by common consent should be deemed an act of aggression? The refusal to submit to arbitration. The Minister of Labour, in a pamphlet entitled "Labour and Industrial Peace," touches on the question of arbitration and says it is becoming more and more a practical method of settling disputes, but he says, "It seems absolutely impossible at the moment even to dream of any compulsion." That was the attitude of the Trade Union Congress towards arbitration.

The Minister of Labour, however, in the above pamphlet speaks of the value of Courts of Inquiry, as on inquiry the facts are laid before the public and "public opinion still is a tremendous force with both employers' organisations and trade unions." We do not know why the word "still" occurs in this passage, as we presume it is not intended to nationalise public opinion, but we desire to make the point that if the views expressed by the Prime Minister as being the opinion of the Labour Party on international questions are applied to industrial matters a long step will have been made towards compulsory arbitration before a dispute is followed by a lock-out or a strike.

In every dispute nowadays public opinion is invoked and there is propaganda to secure public favour. Let the public accept the easy dictum of the Prime Minister that a refusal to submit to arbitration indicates the aggressor in the dispute, and it will make arbitration compulsory in fact, for the aggressor in a trade dispute who has neglected to try methods of conciliation will know that it is vain for him to play to the gallery and obtain public support or sympathy.

The public desire peace and there is a movement at the moment to secure it. In past times the trade unions have found that a policy of aggression rather tends to increase their membership and they have discouraged co-partnership schemes and arbitration because, as has been often asserted, it saps the loyalty of their members; but public opinion has ripened during the past few years, and if public opinion has the force attributed to it by the Minister of Labour it seems not too much to hope that in the future the trade union which strives to adopt peaceful methods will find its membership more secured than can ever be the case by militant measures.

At any rate, the public has a simple test laid before it in every dispute as applied by the Prime Minister to the nations: Who is the aggressor?

NEW BUILDINGS IN LONDON

Vauxhall.—Work has just started on the erection of an extension to the Brabazon House Ladies' Hostel at Vauxhall Bridge-road, S.W.1. The new building will be of five floors and basement, providing an additional 26 bedrooms, four bathrooms, lavatories, a lounge and reception office. Costing £12,000, including equipment, the work will be executed in brick on a steel framework. Concrete floors will be laid, reinforced with B.R.C. fabric. The roof will be of Mansard type facing Vauxhall Bridge-road, covered with Westmorland slates, whilst behind will be a flat surface of concrete, with an asphalte covering. The architect is Mr. Arthur E. Parsons, Abbey House, Victoria-street, S.W. 1, whilst the contractors are Messrs. H. L. Holloway & Sons, 16, Lewisham High-road, S.E. 14. The steelwork will be supplied by Messrs. Dorman, Long & Co., Ltd., of Central Buildings, S.W.1.

Strand.—Quantities are ready for issue for the conversion of the old Villiers Cinema in Villiers-street, Strand, W.C.2, into a Palais de Danse, winter gardens, &c. The plans show the adaptation of the existing building into a dance hall and winter garden, and the erection of a single-story building in the forecourt, facing on the street, to accommodate a restaurant, reception room, &c. Steel frame construction with brick filling and concrete floors will be adopted, whilst a frontage of artificial stone will be introduced. The dance hall will be capable of holding 1,000 couples. The architects are Messrs. Hatfield & Rowe, of 6, Marlborough-road, Richmond, Surrey. The quantity surveyor is Mr. A J. H. Sprague, 104, High Holborn, W.C.2. The promoters of the scheme are the London and Provincial Dance Halls, Ltd., Capel House, New Broad-street, E.C.2.

Greenwich.—Work will commence at an early date upon the extensions proposed to the Miller General Hospital for South-East London, at Greenwich, S.E.10. A new block of three wards, providing 78 additional beds (three wards of 24 beds and six single-bed wards), new main kitchen, dining-room and classroom for nurses, stores, &c., are to be built, together with the first section of a proposed nurses' home, of five stories, giving 78 bedrooms, to cost £70,000. The buildings will be of brick with stone dressings, and Mansard roof covered with asphalte. A new lift will be installed in the ward block, and also new cooking plant. The architects are Messrs. Pite, Son & Fairweather, 12, Carteret-street, S.W.1, the quantity surveyor being Mr. A. J. Falkner, 12, Carteret-street, S.W.1.

Edgware. — Work is to proceed next month upon the erection of a row of shops at the corner of Hale-lane and Edgwarebury-lane, to the plans of F. Howkins, F.S.I., 1, Russell-parade, Golder's Green-road, N.W.11. Here

will be built 16 shops, with frontages of Crowborough brick, relieved by best red pressed bricks. Portland stone will also be used in the fitting up of the shop fronts. Each shop will have a depth of 43 ft. and the frontages will vary from 19 ft. 6 in. to 28 ft. The accommodation will include a sale space of 750 super feet, two lavatories, two reception rooms, kitchen and scullery, and other domestic offices (on the first floor), and three bedrooms and w.c. on second floor. The floors will be of fireproof materials and the roof will be of hand-made sand-faced tiles. The centre shop facing down towards the new "Tube" station will be occupied by the Westminster Bank, Ltd., when the equipment and fitting up, designed by Messrs. Hall-Jones & Dewhirst, of Parliament Mansions, S.W.1, is completed.

Regent-street.—The site of 252–260, Regent-street, W.1, is now cleared of old buildings, and work will shortly begin on the large shopping arcade which is to cover the area. With the proposed arcade as a central feature, the new block will have frontages on Regent-street, Argyll-street, and Little Argyll-street. Sixteen shops will be provided on these frontages, each with a basement below and a mezzanine floor above Six upper floors will rise above the shops, designed for letting purposes. On each side of the arcade entrance—which will extend from Regent-street to Argyll-street—will be a large shop with a 30 ft. frontage, that on the left extending through to Argyll-street. Further shops will line the frontages to Argyll-street and Little Argyll-street. Three entrances—one in Regent-street, one in Argyll-street, and one in Little Argyll-street—will serve the upper floors, each having an entrance hall and lift. A fourth lift will be installed inside the building. The centre of the site will be left clear for lighting purposes, a large glass dome being provided over the arcade on the ground floor. The total frontage to Regent-street is 100 ft., to Argyll-street about 150 ft., and to Little Argyll-street about 40 ft., the total depth being about 150 ft. The elevations will be carried out in Portland stone. The construction will be on a steel framework with fireproof materials. The roof will be of mansard type covered with Westmorland slates. Plans have been prepared by Mr. S. Gordon Jeeves, 4, George-street, Hanover-square, W.1. The quantities are by Mr. W. H. Webber, 33, Furnival-street, E.C.4.

LAND FOR ROAD WIDENING

SIR Anker Simmons, K.B.E., Official Arbitrator under the Acquisition of Land (Assessment of Compensation) Act, 1919, has issued his award in a claim by Mr. Edmond Warner against the Mayor, Aldermen and Councillors of Woolwich, concerning the latter's acquisition of land on the west side of and adjoining Footscray-road, Eltham, comprising an area of about one-eighth of an acre, for the purpose of widening Footscray-road.

The award is as follows: (1) The Acquiring Authority to pay to the owner the sum of £123 as compensation; (2) the claimant to pay the fees on this award; (3) all other costs to be paid by the respective parties.

At the hearing of the claim, which recently took place at Woolwich Town Hall, Sir Arthur Bryceson (Town Clerk of Woolwich) appeared on behalf of the Acquiring Authority; while Mr. E. A. Stanton (of Messrs. Murray, Hutchins & Co., solicitors, of Birchin-lane, E.C.), represented the claimant.

Mr. F. R. Farrer, F.S.I., of Coleman-street, E.C., giving evidence on behalf of the claimant, said the land had a frontage of 170 ft. to Footscray-road, and a depth of 70 ft. His valuation amounted to £552.

Mr. P. G. Sedgwick, F.S.I., district valuer for the Greenwich district, giving evidence for the Acquiring Authority, valued the land at £170, but said that when the widening of the road had been effected, Mr. Warner would be left with slightly more than half the land. Therefore, in his (Mr. Sedgwick's) opinion, the value of the land taken would be £85.

RATES OF WAGES IN THE BUILDING TRADE.

The following are the rates of wages in the building trade in England and Wales. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons.	Bricklayers.	C'p'ters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Labourers.
Aberdare	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Accrington	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Altrincham	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Ashton-under-Lyne	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Barnsley	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Barrow-in-Furness	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Barry	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Bath	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Bedford	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Birkenhead	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Birmingham	1/9	1/9	1/8½	1/9	1/9	1/9	1/8½	1/4
Bishop Auckland	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Blackburn	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Blackpool	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Bolton	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Bournemouth	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Bradford	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Brentwood	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Bridgwater	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Brighton	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Bristol	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Burnley	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Burton-on-Trent	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Bury	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Cambridge	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Cardiff	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Chatham	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Chelmsford	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Cheltenham	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Chester	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Chesterfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Colchester	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Coventry	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Crewe	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Darlington	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Derby	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Doncaster	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Dudley	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Durham	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
E. Glam. (Mon. Vall.)	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Eastbourne	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Exeter	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Folkestone	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Gloucester	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Grantham	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Grays	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/3½
Grimsby	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Great Yarmouth	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/1
Guildford	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Halifax	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Harrogate	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Hartlepools	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Hastings	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Hereford	1/6	1/6	1/6	1/6	1/6	1/6	1/5	1/1½
Huddersfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Hull	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Ipswich	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Lancaster	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Leamington Spa	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Leeds	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Leicester	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Lichfield	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Lincoln	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Liverpool	1/9	1/9	1/8½	1/9	1/9	1/9	1/8½	1/4
Llanelly	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
London	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/3½
Loughborough	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Luton	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Maidstone	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Manchester	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Mansfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Merthyr Tydfil	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Middlesbrough	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Newcastle-on-Tyne	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Newport, Mon.	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Northampton	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Norwich	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Nottingham	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Oakham	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Oldham	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Oxford	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Plymouth	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/2½
Pontypridd	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Portsmouth	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Preston	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Reading	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Rochdale	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Rochester	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Rugby	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
St. Albans	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
St. Helens	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Scarborough	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Sheffield	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Shrewsbury	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Southampton	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Southend-on-Sea	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Southport	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
South Shields	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Stockport	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Stockton-on-Tees	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Stoke-on-Trent	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Stroud	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5	1/1½
Sunderland	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Swansea	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Swindon	1/6	1/6	1/6	1/6	1/6	1/6	1/5	1/1½
Taunton	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Torquay	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Tunbridge Wells	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Wakefield	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Walsall	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Warrington	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
West Bromwich	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Wigan	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Windsor	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Wolverhampton	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Worcester	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
York	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½

(For rates of wages in the Building Trade in Scotland, see page 578.

CONTRACTS, COMPETITIONS, &c.

For some contracts still open, but not included in this List, see previous issues. Those with an asterisk are advertised in this number. Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in; the name and address at the end is the person from whom or place where quantities, forms of tender, &c., may be obtained.

BUILDING AND PAINTING.

OCTOBER 11.—**Bangor.**—ADDITIONS.—For the erection of laundry premises and disinfector house at the St. David's Hospital, Carnarvon-road, for the Bangor and Beaumaris Union. Mr. B. Evans, Clerk to the Guardians, Union Offices, St. David's Hospital.

OCTOBER 11.—**Chapel-on-le-Frith.**—PAINTING.—For outside painting at the Poor Law Institution, for the B.G. Mr. L. Jagger, Clerk to the Guardians, Union Offices.

OCTOBER 11.—**Crowland.**—RETAINING WALLS.—For the erection of a new bridge, retaining walls, &c., for the Holland C.C. Mr. Wm. A. Rogerson, County Surveyor, Sessions House, Boston.

OCTOBER 13.—**Croydon.**—COTTAGES.—Erection of 12 cottages at Beddington Sewage Farm. Beddington-lane, near Croydon, for the County Borough Council. Borough Engineer, Town Hall, Croydon. Deposit £2 2s.

OCTOBER 13.—**Croydon.**—HOUSES.—Erection of 48 houses (comprising 62 tenements) at Thornton-road, Thornton Heath, in two sections of 24 houses each, or as one tender for the whole, for the County Borough Council of Croydon. Borough Engineer, Town Hall, Croydon. Deposit £2 for each section, or £4 for both sections.

OCTOBER 13.—**Durham.**—PAINTING.—For painting and renovation of the Cold Hesledon Council School, near Murton, and the Wheatley Hill Council School, for the E.C. Mr. A. Moir, District Clerk, District Education Office, Council School, Haswell.

OCTOBER 13.—**Hebburn.**—HOUSES.—For the erection of 37 houses on the Hedgeley-road site. Mr. T. Stuart, Clerk to the Council, 2, Coquet-street.

OCTOBER 13.—**Hull.**—VARIOUS.—For excavating, piling, concreting, and other works on the Alexandra Dock Estate of the L.N.E. Rly., for a Hull firm. Messrs. Todd & Thorp, Land of Green Ginger, Hull. Deposit £2 2s.

OCTOBER 13.—**London.**—STAIRWAYS.—For the construction of two stairways to the existing subway under the Victoria-embankment, near Westminster Bridge. Mr. J. Bird, Clerk of the L.C.C. Deposit £3.

OCTOBER 13.—**Merthyr Tydfil.**—EXTENSION.—For the extension of No. 6 Female Ward at the Infirmary. Mr. F. T. James, Clerk, Union Offices, High-street.

OCTOBER 13.—**Shrewsbury.**—ENGINEERING WORK, ALTERATIONS, PAINTING, &C.—(1) Engineering work, including heating, hot and cold water supply work, re-setting two Cornish boilers, with all new pipework, and the provision of an electric lighting plant, and X-ray apparatus and laundry appliances, at the Berrington Hospital at Cross Houses, near Shrewsbury. (2) Alterations to the buildings at the Hospital. (3) Painting and decorating at the Hospital, for the Guardians of the Atcham Union. Messrs. Henry Lea & Son, consulting engineers, 1, Newhall-street, Birmingham, for quantities of engineering; and Mr. G. W. Deakin, architect, 22, Castle-street, Shrewsbury, for quantities for alterations, and for painting and decorating. Deposit £3 3s. for each set.

OCTOBER 13.—**Urmston.**—PAINTING.—For painting the exterior of 52 houses on the Golden Hill Estate. Mr. J. Heath, Surveyor, Council Offices.

OCTOBER 13.—**Worsborough.**—HOUSING.—For various trades in connection with the erection and completion of 16 houses at Furnace-yard, Worsborough Bridge, for the U.D.C. Mr. Alfd. Clegg, Clerk to the Council, 31, Regent-street, Barnsley. Deposit £3 3s.

OCTOBER 14.—**Cardiff.**—SCHOOL.—For erection of an elementary school on the Tank Field, Mynachdy. Mr. J. J. Jackson, Director of Education, City Hall. Deposit £2 2s.

OCTOBER 14.—**Glasgow.**—VARIOUS WORKS.—For various works required in connection with the proposed erection of a gate lodge in Dumbreck-road, at Bellahouston Park, viz., excavator, brick and mason, carpenter, joiner, glazier, and ironmongery, slater, plumber, plaster, painter. Mr. J. Lindsay, Town Clerk, City Chambers.

OCTOBER 14.—**Guernsey.**—HOUSES.—Erection of 40 houses in Collings-road, and 10 or 12 houses at Sausmarez Mill, St. Martin's, for the States Committee for Homes for Workers, States of Guernsey. States Office, Guernsey, or at the office of Mr. Sydney Newcombe, architect, Greve d'Azette, Jersey.

OCTOBER 14.—**London, E.2.**—FLOORING.—Laying of composite floors at the Children's Homes, High-road, Leytonstone, for the Bethnal Green Board of Guardians. Mr. C. Faulkner Jones, Clerk to the Guardians, Administrative Offices, Bishop's-road, Bethnal Green, E.2. any week day between the hours of 10 a.m. and 12 (noon), and 2 to 4 p.m., Saturdays excepted. Deposit £2.

OCTOBER 15.—**Aldershot.**—WORKS CONTRACT FOR REPAIRS AND MATERIALS.—Works contract from October 24, 1924, at the Blackdown and Deepcut Station. Commanding Royal Engineer, Royal Engineer Office, Marlborough Lines, North Aldershot, Hants.

OCTOBER 15.—**Chorley.**—HOUSES.—For the erection of 60 houses on the Highfield Estate, for the Borough. Mr. Jno. Mills, Town Clerk. Deposit £2 2s.

OCTOBER 15.—**Glamorgan Agricultural Committee.**—VARIOUS.—For erection of (*a*) outbuildings at Tirbach, Aberaman, and (*b*) alterations, repairs and painting at St-y-Nyll. Mr. T. Mansel Franklen, Clerk, County Hall, Cardiff.

OCTOBER 15.—**Ilkley.**—HOUSES.—For erection of 24 houses on a site abutting upon Leeds-road, for the U.D.C. Mr. F. S. Eckersley, Clerk of the Council, Town Hall.

OCTOBER 15.—**Wath-upon-Dearne.**—BUNGALOW.—For erection of a bungalow, for the District Light Railways Joint Committee. Mr. J. Ledger Hawksworth, clerk, Station-road, Bolton-upon-Dearne.

✱OCTOBER 15.—**Wrexham.**—HOUSES.—Erection of an additional 56 houses in groups of 10, 20, and 26 houses on the Acton Park Housing Estate, for the Town Council of Wrexham. Messrs. Lockwood, Abercrombie & Saxon, Cathedral Chambers, St. Werburgh-street, Chester. Deposit £2.

OCTOBER 15.—**Ynysybwl.**—ALTERATIONS.—For alterations at the Lady Windsor Workmen's Hall and Institute, and for redecoration of the premises. Messrs. Thomas and Morgan & Partners, architects and surveyors, 23, Gelliwastad-road, Pontypridd.

OCTOBER 16.—**Brighton.**—HOUSES.—Erection of 11 houses in Hereford-street, Brighton, for the County Borough Council of Brighton. Borough Surveyor, Town Hall, Brighton. Deposit £1.

OCTOBER 16.—**Cardiff.**—HOUSES.—For erection of 94 houses at Ely, for City Council. Mr. C. G. Brown, Town Clerk, City Hall. Deposit £2 2s.

OCTOBER 16.—**Ely.**—HOUSES.—For the erection of 94 houses, for the Cardiff City Council. Mr. C. G. Brown, Town Clerk, City Hall, Cardiff. Deposit £2 2s.

✱OCTOBER 16.—**London, S.W.2.**—Painting and decoration of four underground conveniences, for the Lambeth Borough Council. Mr. Osmond Cattlin, Assoc.M.Inst.C.E., Borough Engineer, Lambeth Town Hall, Brixton Hill, S.W.2, on receipt of a stamped addressed envelope. Mr. Bruce Penny, Town Clerk, Lambeth Town Hall, Brixton Hill, S.W.2.

✱OCTOBER 16.—**London, N.1.**—FLATS.—Erection of 102 flats on the site adjoining the Municipal Buildings, Tyndale-place, Upper-street, Islington, N.1, for the Metropolitan Borough Council of Islington. Mr. E. C. P. Monson, F.R.I.B.A., Council's Architect, 192, Finsbury-pavement House, 120, Moorgate, London, E.C. Deposit £5.

OCTOBER 16.—**London.**—DECORATIONS.—For repair and redecoration of the Mortuary and Coroner's Court, High-street, Lambeth, and the Mortuary, Wanless-road, Loughborough Junction, S.E.24, for the Lambeth B.C. Mr. B. Penny, Town Clerk, Town Hall, Brixton Hill, S.W.2.

OCTOBER 16.—**Pontargothi.**—HALL.—For erection of a memorial hall. Mr. T. Lewis, Brynglas, Nantgaredig.

✱OCTOBER 16.—**Rochford (Essex).**—HOUSES.—Erection of workmen's dwelling houses, as follows: Contract No. 1, Great Stambridge, 18 houses; Contract No. 2, Canewdon, 14 houses; Contract No. 3, Rochford, 6 houses, for the Rochford R.D.C. Surveyor of the Council, Mr. A. E. Madge, at his office at Rayleigh. Deposit £1 1s.

OCTOBER 16.—**Warrington.**—HOUSES.—Erection and completion of 54 houses on the Reynolds-street site, for the Housing Committee of the County Borough of Warrington. Borough Engineer and Surveyor, Town Hall, Warrington. Deposit £2 2s.

✱OCTOBER 17.—**Hereford.**—ALTERATIONS, &C.—Works required in connection with the alterations, &c., to be carried out at the old City Gaol, Gaol-street, Hereford, for the T.C. Mr. W. McNeil Shimmin, A.M.Inst.C.E., City Engineer, Town Hall, Hereford. Deposit £1 1s.

OCTOBER 17.—**Trowbridge.**—HOUSES.—Erection of 20 houses in 10 pairs on the Rock Housing Estate, for the Trowbridge U.D.C. Mr. Walter W. Snailum, Church-street, Trowbridge.

OCTOBER 18.—**Clacton-on-Sea.**—HOUSES.—For the erection of 44 houses on the Croft Estate, for the U.D.C. Mr. Geo. T. Lewis, Clerk to the Council, Council Offices.

✱OCTOBER 18.—**Grays, Essex.**—HOUSES.—Erection of 106 houses, together with roads, sewers, fencing, and attendant works at West Thurrock, Grays, Essex, for the Lafarge Aluminous Cement Co., Ltd., of Lincoln House, High Holborn, W.C.1. Mr. Edward Fincham, A.R.I.B.A., P.A.S.I., Architect and Surveyor, 4, Orsett-road, Grays, Essex. Deposit £2 2s.

OCTOBER 18.—**Haslemere.**—HOUSE.—For construction of an engine house at Sturt-road, for the U.D.C. Mr. C. A. Best, Surveyor to the Council, Council Offices. Deposit £1 1s.

OCTOBER 18.—**Tilbury.**—FENCING.—For providing and fixing approximately 1½ miles of reinforced concrete fencing consisting of posts 10 ft. apart, in the South Ward of Tilbury, for the U.D.C. Mr. A. W. Buckner, Clerk of the Council, Council Offices.

OCTOBER 20.—**Harrogate.**—ALTERATIONS.—For alterations at Harrogate Station, for the L.N.E. Railway. Messrs. James McLaren & G. F. Thurston, joint secretaries, Secretary's Office, Marylebone Station.

OCTOBER 20.—**Port Talbot.**—LODGES.—For erection of two lodges at the main entrance to the Talbot Memorial Park. Mr. Moses Thomas, Town Clerk.

✱OCTOBER 20.—**Romford (Essex).**—BUILDING ROADS, DRAINS, AND PAINTING.—Erection of lorry sheds, workshop and cart sheds, including roads, fences, drains, &c., and for repairing and painting existing depot buildings and caretaker's cottage, at the Depot Buildings, in Rainham-road, Hornchurch, Essex, for the Romford R.D.C. Mr. W. J. Grant, Surveyor to the Council, 16a, South-street, Romford.

OCTOBER 20.—**Southend-on-Sea.**—HUTS, &C.—For (*a*) the construction of concrete, steel and wood bathing huts and platforms on the foreshore, and (*b*) timber bathing huts, and incidental works, for the T.C. Mr. H. J. Worwood, Town Clerk, Municipal Buildings, Clarence-road. Deposit £2 each.

✱OCTOBER 20.—**Southport.**—HOUSES.—Erection of 50 houses at Halsall-road and 50 houses at Canning-road, for the Corporation of the County Borough of Southport. The tenders invited are for the whole or not less than ten houses. Mr. A. E. Jackson, Borough Engineer, Town Hall, Southport. Deposit £1 1s.

OCTOBER 20.—**Tredegar.**—CENTRE.—For erection of a centre for instruction in handicrafts and domestic

BUILDING TRADE WAGES IN SCOTLAND.*

THE following are the present rates of wages in the building trade in the principal towns of Scotland. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Brick-layers' Labourers.	Plasterers' Labourers.
Aberdeen	1/8	1/8½	1/8	1/8	1/8	1/8	1/6	1/0½	
Airdrie	1/8	1/8	1/8	1/8	1/8	—	1/6½	1/3	
Alexandria	1/8	1/8	1/8	1/8	1/8	1/8	—	1/2½ to 1/3½	
Arbroath	1/7	1/7	1/7	1/7½	1/7	1/7	1/5½	1/1½	
Ayr	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Bathgate	1/8	1/8	1/8	1/8½	1/8	1/8	1/6½	1/2 to 1/3	
Blairgowrie	1/7	1/7	1/7	1/7½	1/5	1/7	1/4	10d. to 1/-	
Bo'ness	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3	
Coatbridge	1/8	1/8	1/8	1/8	1/8	—	1/6½	1/3 to 1/3½	
Dumbarton	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3½	
Dumfries	1/6	—	1/6	1/6	1/6	1/6	1/6	1/3½	
Dundee	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3	
Dunfermline	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3½	
Edinburgh	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½	
Falkirk	1/7½	1/7½	1/7	1/8	1/7	1/7	1/6½	1/2½	
Fort William	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/2	
Gainshiels	1/6½	1/5½	1/6½	1/7	1/6	1/6½	1/6	1/2	
Glasgow	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½	
Greenock	1/8	1/8	1/8	1/9	1/8	1/8	1/7	1/0½ to 1/3½	
Hamilton	1/8	1/8	1/8	1/9	1/8	1/8	1/6½	1/3½	
Hawick	1/6	1/6	1/6	1/6–1/6½	1/6	1/6	1/6	1/2	
Helensburgh	1/8	1/8	1/8	1/9	1/8	1/8	1/7	1/3½	
Inverness	1/5	—	1/4½	1/4	1/5	1/5	1/4	11d. to 1/2	
Kilmarnock	1/8	1/8	1/8	1/9	1/8	1/8	1/7	1/3½	
Kirkcaldy	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3½	
Kirkwall	1/4½	1/4½	1/3½	1/4	1/4½	1/4	1/3	1/0	
Lanark	1/8	1/8	1/8	1/9	1/8	1/8	1/6	1/- to 1/3	
Leith	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½	
Motherwell	1/8	1/8	1/8	1/9	1/8	1/8	1/6½	1/3½	
Perth	1/8	1/8	1/8	1/9	1/8	1/8	1/6½	1/3	
Stirling	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3½	
Stirlingshire (Eastern District)	1/8-1/10	1/8-1/10	1/8	1/9	1/7	1/8	1/6½	1/3½	
Wishaw	1/8	1/8	1/8	1/9	1/8	1/8	1/7	1/3½	

* The information given in this table is copyright. The rates of wages in the various towns in England and Wales are given on page 575

subjects at Georgetown Council School. Mr. C. Dauncey, Secretary, County Hall, Newport, Mon.

OCTOBER 21.—**Caerphilly.**—SHOP.—For erection of shop, for G.W.R. Mr. A. E. Bolter, Paddington Station, W.2.

✱OCTOBER 21.—**London, S.W.**—TELEPHONE EXCHANGE.—Erection of a telephone exchange in Battersea, London, for the Commissioners of H.M. Office of Works. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W. 1. Deposit £1 1s. (Cheques payable to the Secretary.)

✱OCTOBER 22.—**Brentwood, Essex.**—ADAPTATIONS.—Adaptations (to form a telephone exchange) at Brentwood, Essex, for the Commissioners of His Majesty's Office of Works. Contracts Branch, H.M.O.W., King Charles-street, London, S.W.1. Deposit £1 1s. (cheques payable to the Secretary).

OCTOBER 22.—**Ecclesfield.**—ROOM.—For the erection of a teachers' room at Warren Council School, for the West Riding C.C. The Education Department, County Hall, Wakefield.

OCTOBER 22.—**Great Ouseburn.**—ADDITIONS.—For alterations and additions to Great Ouseburn council school: (*a*) Excavator, Mason, and Bricklayer; (*b*) Carpenter and Joiner; (*c*) Slater; (*d*) Plumber; (*e*) Plasterer; (*f*) Painter, for the West Riding E.C. The Education Department, County Hall, Wakefield.

OCTOBER 22.—**Thurnscoe.**—SCHOOL.—For erection of a new school. Education Department, West Riding E.C., County Hall, Wakefield.

OCTOBER 22.—**Whittingham.**—VARIOUS.—Various work is required for the erection of sixteen cottages on a site near the Whittingham Mental Hospital, as follows: (1) Roads and sewers; (2) brick and stonework; (3) slating; (4) plastering; (5) woodwork; (6) plumbing. Mr. L. Cotman, Clerk to the Committee of Visitors. Deposit 10s. 6d. each.

✱OCTOBER 23.—**London, E.1.**—BALCONIES.—Providing and fixing new balconies to certain wards at the Hospital at Raine-street, Old Gravel-lane, E.1, for the Guardians of St. George in the East. Mr. R. M. Lochner, Clerk, Guardians' Offices, Raine-street, Old Gravel-lane, E.1, on receipt of postage (3d).

OCTOBER 23.—**Rochford, Essex.**—ALTERATIONS.—Alterations, &c., to the Post Office, Rochford, Essex, for the Commissioners of His Majesty's Office of Works. Contracts Branch, H.M.O.W., King Charles-street, London, S.W.1. Deposit £1 1s. (cheques payable to the Secretary).

✱OCTOBER 24.—**Cheltenham.**—CONCRETE CONSTRUCTION.—Construction of pre-filter tanks of ferro-concrete, and the building of an engine house of concrete blocks (provided by the Corporation), and works incidental thereto at the Water Works, Dowdeswell, for the Corporation of the Borough of Cheltenham. Mr. J. S. Pickering, Municipal Offices, Cheltenham. Deposit £3.

OCTOBER 25.—**Usk.**—BUILDINGS, &C.—For the erection of buildings for the Agricultural Institute, comprising residential block, scholastic block, additions to dairy, and power house. Mr. C. Dauncey, Secretary, County Hall, Newport, Mon. Deposit £2 2s.

OCTOBER 27.—**Edinburgh.**—VARIOUS.—Various work for St. John's R.C. School, Portobello—mason, joiner, slater, plasterer, plumber, steel work. Mr. J. Stewart, S.S.C., Executive Officer, Education Offices.

OCTOBER 27.—**London, S.E. 18.**—LAVATORY ACCOMMODATION.—Erection of additional lavatory accommodation at the Guardians' Offices, 394, High-street, Lewisham, S.E.13, for the Guardians of the Poor of the Lewisham Union. Guardians' Offices, 394, High-street, Lewisham, S.E. Deposit £1 1s.

✱OCTOBER 27.—**London, E.**—DWELLINGS.—Erection of a block of dwellings on the Whitemore Estate (Ware-street area), Shoreditch, for the L.C.C. Architect to the Council, The County Hall (Room No. 3), Westminster Bridge, S.E.1. Deposit £2, payable to the Cashier.

✱OCTOBER 27.—**Newmarket.**—HOUSES.—Erection of 10 brick and slated houses in five pairs, at Stamford-street, Newmarket, in the County of Suffolk, for the Urban District Council of Newmarket. Mr. W. H. Eley, Surveyor, Godolphin House, Newmarket.

OCTOBER 27.—**Salcombe.**—ALTERATIONS.—For alterations, &c., at the Salcombe Hotel, Salcombe. Mr. E. H. A. Barron, architect, 11, The Crescent, Plymouth.

✱OCTOBER 28.—**Basford, near Nottingham.**—TELEPHONE EXCHANGE.—Erection of a Telephone Exchange at Basford, near Nottingham, for the Commissioners of His Majesty's Office of Works. Contracts Branch, H.M.O.W., King Charles-street, London, S.W.1. Deposit £1 1s. (cheques payable to the Secretary).

✱OCTOBER 28.—**Windsor.**—CONCRETE HOUSES.—Erection of six houses in concrete, contractors to provide their own designs and estimates, for the Windsor T.C. Mr. E. A. Stickland, Borough Surveyor, Alma-road, Windsor.

✱OCTOBER 29.—**Gravesend.**—ALTERATIONS, &C.—Alterations to the Post Office and erection of a new telephone exchange at Gravesend, for the Commissioners of His Majesty's Office of Works. Contracts Branch, H.M.O.W., King Charles-street, London, S.W.1. Deposit £1 1s. (cheques payable to the Secretary).

NO DATE.—**Kilmarnock.**—WORKS.—Various works for the erection of 24 houses—digger and brick, carpenter and joiner, glazier, slater, plumber, plaster and cement, painter work. Mr. N. J. Campbell, Town Clerk, Council Chambers.

NO DATE.—**Pontardulais.**—BUNGALOW.—Erection of a country residence near Bolgoed Farm. Messrs. W. Griffiths & Son, architects, Falcon Chambers, Llanelly. Deposit £2 2s.

NO DATE.—**Rawmarsh.**—HOUSES.—For the erection of 25 houses on the Haugh-road site, for the U.D.C. Mr. J. A. Tonge, Architect to the Council, Council Offices, Parkgate, Yorks, W.R. Deposit £1.

✱NO DATE.—**Watford, Herts.**—STRUCTURAL ALTERATIONS AND ADDITIONS.—Structural alterations and additions at premises Nos. 211–213, St. Albans-road, Watford, Herts, for Messrs. Timothy White & Co., Ltd. (Constructional Department), 30, Chandos-street, Portsmouth, from whom all particulars may be obtained.

✱NO DATE.—**Whetstone.**—BUNGALOWS.—Erection of pair medium-sized bungalows. Mr. E. E. Briggs, architect & surveyor, 99, High-street, Southend-on-Sea.

FURNITURE, MATERIALS, etc.

OCTOBER 11.—**Bootle.**—GRANITE.—For supplying (*a*) 105 lineal yds. of straight granite kerbs and 25 lineal yds. of circular granite kerbs, (*b*) 500 lineal yds. of straight granite channels and 50 lineal yds. of circular granite channels, (*c*) 250 lineal yds. of granite crossing stones, for the Corporation. Mr. J. Spencer Tumilty, Town Clerk.

OCTOBER 13.—**Edinburgh.**—CEMENT.—For the supply of Portland cement to the Tramways Depot, Shrubhill. Mr. A. Grierson, Town Clerk, City Chambers.

OCTOBER 16.—**Aberdeen.**—PIPES.—For supply and laying of ¼ mile of 9 in. diameter cement-lined cast-iron pipes and specials, for the T.C. Mr. G. Mitchell, Water Engineer, 41½, Union-street. Deposit £2.

ENGINEERING, IRON AND STEEL.

OCTOBER 13.—**Aldershot, Hants.**—ARTIFICER'S WORK.—Maintenance Contracts, from October 15, 1924, at the Station hereafter mentioned in the South Aldershot Royal Engineer District of the Aldershot Command 1:—South Aldershot, including Ewshot and Crookham. Commanding Royal Engineer, R.E. Office, Headquarters, Stanhope Lines, Aldershot, Hants.

OCTOBER 14.—**Eastbourne.**—TIDAL FLAPS.—For the removal of existing tidal flaps, &c., in the valve chamber, Langney Point, and the supply and fixing of new tidal and sluice valves. Mr. Leslie Roseveare, Borough Engineer, The Town Hall. Deposit £1 1s.

OCTOBER 15.—**Bedlington.**—CULVERT.—Construction of a concrete culvert and the diversion of the Sleekburn under Sleekburn Viaduct, near Bedlington Station, for the London & North Eastern Railway Co. Chief Engineer, North Eastern Area, York.

OCTOBER 15.—**North Seaton.**—VIADUCT.—For the reconstruction of North Seaton Viaduct, for the London & North Eastern Railway Co. Office of the Chief Engineer North Eastern Area. York.

OCTOBER 22.—**Dundee.**—STEEL BRIDGE.—For the construction, supply, delivery and erection in its place at the entrance to Camperdown Dock of a steel bridge caisson, for the Harbour Trust. Mr. J. Hannay Thompson, General Manager and Engineer, Dundee Harbour Trust.

OCTOBER 24.—**Cheltenham.**—TANKS.—For the construction of pre-filter tanks of ferro-concrete and the building of an engine house of concrete blocks. Mr. J. S. Pickering, Borough Engineer, Municipal Offices. Deposit £3.

OCTOBER 24.—**London, E.C.4.**—LIFT.—Erection of a new lift at the G.P.O. (South), Queen Victoria-street, E.C.4, for the Commissioners of His Majesty's Office of Works. Contracts Branch, H.M.O.W., King Charles-street, London, S.W.1. Deposit £1 1s. (cheques payable to the Secretary).

OCTOBER 27.—**Berwick.**—BRIDGE.—For construction of a ferro-concrete bridge over the Tweed, consisting of approaches, and arches up to 360 ft. in span. Messrs. L. G. Mouchel & Partners, Ltd., Civil Engineers, Trinity Buildings, 25, New Bridge-street, Newcastle-on-Tyne. Deposit £100.

OCTOBER 27.—**Bristol.**—BRIDGE.—For the reconstruction of the swing bridge over the Junction Lock, Cumberland Basin, for the Port of Bristol. Mr. T. A. Peace, Chief Engineer, Chief Engineer's Office, Avonmouth Dock. Deposit £5.

OCTOBER 27.—**Findochty.**—EXTENSION.—For the extension of the harbour, comprising the excavation of the harbour bed and the construction of a mass concrete jetty, mass and reinforced concrete quay walls, and relative works, for the Burgh. Mr. W. Smith, solicitor, 12, East Church-street, Buckie.

OCTOBER 28.—**Wellington, N.Z.**—BRIDGE SPANS.—For plate girder spans for Wairoa, Rangitaiki and Awakeri bridges, for N.Z. Public Works Board. Dept. of Overseas Trade, 35, Old Queen-street, S.W.1.

OCTOBER 31.—**Beaufort West (Cape Province).**—POWER STATION.—Electric power station plant, for the T.C. Department of Overseas Trade (Room 52).

NOVEMBER 3.—**Sydney, N.S.W.**—BRIDGE SPANS.—For metal work for superstructure of bridge at Tom Ugly's Point, for Department of Public Works, Sydney. Dept. of Overseas Trade, 35, Old Queen-street, S.W.1.

NOVEMBER 20.—**Chile.**—HARBOUR WORKS.—For harbour works in the port of Lebu. Chilean Legation, 22, Grosvenor-square, W. 1.

DECEMBER 31.—**Hamilton.**—BRIDGE.—Erection of Clyde Bridge, Hamilton, for the Joint Committee of the County Council of the County of Lanark, Town Council of the Burgh of Hamilton, and Town Council of the Burgh of Motherwell and Wishaw. Messrs. Formans & M'Call, C.E., 160, Hope-street, Glasgow. Deposit £1 1s.

ROAD, SANITARY, AND WATER WORKS.

OCTOBER 11.—**Birmingham.**—SEWER.—For the construction of about 32 yds. egg-shaped brick and concrete sewer, and 919 yds. stoneware pipe sewers. Mr. H. H. Humphries, City Engineer and Surveyor, The Council House. Deposit £2.

OCTOBER 11.—**Hemsworth.**—CONVERSION.—For conversion of six existing privies and ashpits, and erection of six new w.c.'s at Bond-street, Kinsley, near Pontefract. Mr. A. Wright, Clerk to the Council, Council Offices, Barnsley-road, Hemsworth, near Pontefract.

OCTOBER 13.—**Abertysswg.**—SEWERS.—For laying 1,090 yds. of 6 in. and 688 yds. of 9 in. storm water sewer, &c., at Abertysswg, for the Rhymney U.D.C. Mr. W. H. Trump, Clerk, 57, High-street, Rhymney.

OCTOBER 13.—**Barnes.**—ADDITIONS.—For constructing an addition to the public sanitary convenience, Barnes Common, for the U.D.C. Mr. G. Bruce Tomes, A.M.Inst.C.E., Surveyor to the Council, The Council House, High-street, Mortlake. Deposit £1 1s.

OCTOBER 13.—**Barnes.**—ROAD AND SEWER.—For the construction and drainage of an extension to Hertford-avenue, East Sheen, for the U.D.C. Mr. G. Bruce Tomes, Surveyor to the Council, The Council House, High-street, Mortlake.

OCTOBER 13.—**Coseley.**—SEWERAGE.—Stoneware and cast-iron sewers, manholes, pumping station, and other works at Princes End, for the U.D.C. Messrs. Berrington, Son, & Watney, engineers, Prudential Chambers, Lichfield-street, Wolverhampton. Deposit £5 5s.

OCTOBER 13.—**Eastbourne.**—SEWERS.—For laying water sewers in Victoria-drive. Mr. L. Roseveare, Borough Engineer, Town Hall.

OCTOBER 13.—**Hornsey.**—SEWERS.—For the construction of about 2,000 ft. run of sewers and surface water sewers, at their housing site, Coppett's-road, Muswell Hill, N.10. Mr. F. D. Askey, Town Clerk, Town Hall, Highgate, N.6.

OCTOBER 13.—**Loughborough.**—ROADS.—(*a*) For making-up of approximately 676 lin. yds. of Beacon-road, including storm water sewers, kerbing, channelling, &c. Deposit £3 3s. (*b*) For providing, laying and jointing of about 112 yds. of 9 in. stoneware pipe sewers and the construction of about 130 lin. yds. of granite rubble foundation in connection with the Burleigh-road extension. Mr. H. Perkins, Town Clerk. Deposit £1 1s.

OCTOBER 13.—**Lytham St. Anne's.**—STREETS.—For making-up nine private streets within the Borough, for the Corporation. Mr. T. Bradley, Town Clerk, Town Hall, St. Anne's.

OCTOBER 13.—**Rhymney.**—SEWER.—For laying of about 1,090 yards 6 in. and 688 yards 9 in. storm water sewer, &c. Mr. W. H. Trump, clerk, Clerk's Office, 57, High-street.

OCTOBER 13.—**Ripon.**—SEWERS.—For laying of sewers and reinforced concrete back road. Mr. J. H. Gough, Town Clerk, Town Hall. Deposit £3.

OCTOBER 14.—**London.**—PAVING.—For the making-up and paving of a section of Imperial-road, for the Fulham B.C. Mr. J. P. Shuter, Town Clerk.

OCTOBER 14.—**Southall-Norwood.**—CARRIAGEWAYS.—For resurfacing carriageways in various streets. Mr. J. B. Thomson, Assoc.M.Inst.C.E., Engineer and Surveyor to the Council, Town Hall, Southall.

OCTOBER 15.—**Hove.**—WOOD PAVING.—Providing and laying wood paving in Goldstone-street, between Clarendon Villas and the south side of the railway bridge (about 4,370 yds. super.) for the Borough Council of Hove. Borough Surveyor, Town Hall, Hove.

✱OCTOBER 16.—**Hove.**—SEWERS AND ROAD WORK.—Constructing sewers, forming roadways, laying kerbing, channelling, and other works in connection with the housing estate in Old Shoreham-road, within the Borough of Hove, for the Borough Council. Borough Surveyor's Office, Town Hall, Hove.

OCTOBER 16.—**Wallasey.**—CONVENIENCE.—For erection of a public convenience at Leasowe-road, for the B.C. Mr. G. Livsey, Town Clerk, Town Hall. Deposit £2 2s.

OCTOBER 17.—**Southampton.**—MAINS.—For laying 2,000 yds. of 36 in. and 6,250 yds of 33 in. cast-iron water mains. Mr. R. R. Linthorne, Town Clerk. Deposit £3 3s.

OCTOBER 20.—**Burntisland.**—RESERVOIR.—For the construction of a storage reservoir, &c., on a site near Stenhouse Farm. Messrs. Brown & Gilmour, Joint Town Clerks, Town Clerks' Office.

OCTOBER 20.—**Fermanagh.**—ROADS.—For construction of roads, for the C.C. Mr. J. P. Burkett, County Surveyor, Enniskillen. Deposit £5.

OCTOBER 20.—**Greenford.**—DRAINAGE.—For the extension of the main drainage system, comprising about six miles of 7 in., 9 in., and 12 in. sewers, manholes, &c. Mr. A. Lloyd Jones, Clerk to the Council, New Broadway Chambers, New Broadway, Ealing. Deposit £3 3s.

OCTOBER 20.—**Heckmondwike.**—RECONSTRUCTION.—For reconstruction of about three-quarters of a mile of Birstall and Huddersfield main road, within the U.D.C. Mr. A. H. Redfearn, Clerk, Council Offices.

OCTOBER 20.—**Rochester.**—SEWERAGE.—For construction of stoneware pipe sewers as follows:—5,935 lin. yds. 7 in. sewers; 1,286 lin. yds. 9 in. sewers; 525 lin. yds. 12 in. sewers; 322 lin. yds. 15 in. sewers, for the T.C. Mr. Apsley Kennette, Town Clerk, Guildhall. Deposit £5 5s.

OCTOBER 20.—**Wantage.**—SEWERS.—For laying of 1,250 yds. of 9 in., and 225 yds. 7 in. stoneware and cast-iron outfall and auxiliary sewers, &c., for the R.D.C. Mr. E. B. Ormond, Clerk to the Council, Wantage. Deposit £2 2s.

OCTOBER 21.—**Dover.**—WIDENING.—(1) For road widening and tarmacadam works, Limekiln-street and Bulwark-street; and (2) building alterations to the drainage works, and incidental constructional works. Mr. Wm. Boulton Smith, Borough Engineer, Maison Dieu House. Deposit £1 1s. each.

OCTOBER 25.—**Plygyrhiw.**—ROAD.—For the construction of two sections of new road at Plygyrhiw and Penlan, near Llandyssul, for the Carmarthenshire C.C. Mr. R. W. Jones, County Surveyor, County Offices, Carmarthen. Deposit £3 3s.

OCTOBER 31.—**Blackpool.**—MAINS.—For laying cast-iron mains between Stocks Reservoir, in the West Riding, and Westby Reservoir, near Blackpool, in the County of Lancaster: (1) 12,919 yds. of 27 in. main; (2) 12,518 yds. of 27 in. main; (3) 12,346 yds. of 25 in. main; (4) 12,240 yds. of 25 in. main. Mr. G. F. Atkinson, Engineer, The Fylde Water Board, Seftons-street. Deposit £5.

NO DATE.—**Doncaster.**—SEWERAGE.—For furnishing and laying of about 1,900 yds. of 12 in. cast-iron and earthenware pipe sewers, with manholes, &c., at the Bainby-Dun-with-Kirk-Sandall, for the R.D.C. Mr. H. M. Marshall, Clerk, Union Offices. Deposit £5.

NO DATE.—**Maidstone.**—ROAD.—For the works required in the widening, improvement and diversion

on the Maidstone–Folkestone road, for the Kent C.C. Mr. H. T. Chapman, M.Inst.C.E., County Surveyor, St. Peter-street.

Competitions.

(See Competition News, page 546.)

Auction Sales, Tenders, etc.

✱OCTOBER 15.—**Lingfield, Surrey.**—Mr. C. E. Clark will sell, without reserve, at Borer's Auction Ground, Lingfield, Surrey (adjoining Lingfield Racecourse), sale of prime timbers, &c. Auctioneers, Beddington House, near Croydon.

✱OCTOBER 16.—**Herefordshire.**—Messrs. Apperley & Brown will sell, on the premises, Staunton Park, Staunton-on-Arrow, Herefordshire, the whole of the costly interior and exterior fixtures and fittings from the demolition of an early Georgian mansion. Auctioneers, Bank Chambers, Hereford.

OCTOBER 16.—**London, E.C.**—Messrs. C. C. & T. Moore will sell, at the London Auction Mart, a freehold and copyhold estate at Enfield. Auctioneers, 7, Leadenhall-street, E.C.3.

✱OCTOBER 20.—**Barnes, S.W.**—Mr. Richard J. Steel has been instructed by Mr. P. Vine to sell, upon the premises, The Field, Lonsdale-road, Barnes, S.W., a quantity of new and second-hand building material of a large variety, three bow huts, sectional huts, vans, coal trolleys, tip-carts and numerous other items. Auctioneers, 2, Plough-terrace, South Ealing, W.5.

OCTOBER 21 AND 22.—**Swindon, Wilts.**—Mr. F. H. Clark will sell, without reserve, at the Central Stores Depot No. 18, Swindon, Wilts. (near Swindon Station, G.W. Railway) final clearance sale of timber buildings and building materials. Auctioneer, Railway Wharf, York-road, Wandsworth, S.W.18.

✱OCTOBER 23.—**London, E.14.**—Messrs. Henry Butcher & Co. will sell, by order of H. T. Bloor, Esq., A.C.A., receiver for the Debenture Holders *re* F. W. Bunt & Co., Ltd., on the premises, London-street, Commercial-road, Stepney, E.14, packing-case manufacturers' plant and woodworking machinery, &c. Auctioneers, 63–64, Chancery-lane, London, W.C.1.

✱NOVEMBER 18.—**London, E.C.2.**—Messrs. Ventom, Cooper & Co. will sell, by order of the owners, who no longer require this section of their extensive works (unless previously disposed of privately), in one or more lots, the valuable freehold property erected by Brifco, Ltd., at Ashtead, on an enclosure of about 17 acres of land, mainly walled in, and comprising five extensive modern blocks of buildings, plant and machinery. Auctioneers, 35, Old Jewry, London, E.C.2.

Public Appointments.

✱OCTOBER 11.—**East Ham, London, E.C.**—BUILDING INSPECTOR.—Building inspector (temporary appointment), for a period of six months from date of commencement of duties, required by the County Borough of East Ham. Applicants must hold Royal Sanitary Institute Certificate in sanitary science as applied to buildings and public work. Mr. C. Eustace Wilson, Town Clerk, Town Hall, East Ham, E. 6.

OCTOBER 13.—**Greenwich, S.E.10.**—Office Clerk required in the Borough Engineer's Department by the Metropolitan Borough Council of Greenwich. Mr. Frederick J. Simpson, Town Clerk, Town Hall, Greenwich-road, S.E.10.

OCTOBER 14.—**Auckland, New Zealand.**—Professor of Architecture required by Registrar, Auckland University College, Auckland. London Agent of the University of New Zealand, Mr. J. W. Joynt, M.A., 88, Gower-street, W.C.1.

✱OCTOBER 20.—**Leeds.**—Full-time Lecturer in the Department of Building, to teach building construction and allied subjects required at the Leeds Technical School by the Leeds Education Committee. Mr. James Graham, Director of Education, Education Offices, Leeds.

✱NO DATE.—**Hong Kong.**—ARCHITECTURAL ASSISTANTS.—Assistants (three) required by the Government of Hong Kong, for service in the Architectural Office of the Public Works Department, for a period of three years, with possible permanency. Apply at once, by letter, to the Crown Agents for the Colonies, 4, Millbank, Westminster, S.W.1 (quoting M-12919).

✱NO DATE.—**London, E.9.**—Clerk of the Works wanted in connection with erection of new buildings (contract £20,000). Clerk to the Guardians, Hackney Union, 2, Sidney-road, Homerton, E.9.

✱NO DATE.—**London, N.7.**—Lecturer required in structural steel and reinforced concrete at the Northern Polytechnic Institute, Holloway, London, N.7. Apply to the Secretary.

Building Materials Bill Deputation.

The Minister of Health recently received a deputation from representatives of the manufacturers and suppliers of building materials. The deputation, while accepting the principle of legislation directed against persons seeking to exploit the necessities of the country, represented that some of the provisions of the Building Materials (Charges and Supply) Bill went beyond the pledges that had been publicly given by the Minister in the course of the negotiations prior to the Housing Bill. In particular they could not accept the clauses of the Bill providing for temporary taking over of works in certain circumstances. The Minister undertook that if they could put forward amendments which, without prejudice to the underlying principles, would meet their requirements, he would give them full and fair consideration.

PROPOSED NEW BUILDINGS & OTHER WORKS *

In these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works at the time of publication have been actually commenced. Abbreviations: T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; B.G. for Board of Guardians; B.C. for Borough Council; P.C. for Parish Council; M.H. for Ministry of Health; M.T. for Ministry of Transport; and B.E. for Board of Education.

ABERDEEN.—Plans passed by the T.C.: For three bungalows and a mission hall. The three bungalows, it is estimated will cost £3,300, and the mission hall £1,500. Altogether plans to the estimated value of £8,430 were passed.—The Scottish Hierarchy have issued an appeal for funds for the extension and maintenance of Blair Cottage. The estimate is £20,000.

AMBLE.—Messrs. D. Balfour & Son, engineers, Newcastle, have plans ready for an additional reservoir for the U.D.C. Two sites on the Albert Housing Estate were granted Mr. J. Sample, builder, Amble, for building purposes.

AMERSHAM.—The R.D.C. have plans under consideration for new building work at The Vale, near Chesham, Great Missenden, Amersham, Ley Hill, Chalfont St. Peter, Amersham Common, Chalfont Station Village, Chalfont St. Giles, Rignall, Knotty Green, and Ballinger.

ANCOATS.—A new nursery school is to be erected. The proposed site, which has been offered by the Ancoats Settlement, is in Every-street.

AUCKLAND.—The R.D.C. has obtained sanction from the M.H. for the borrowing of £12,857 for the erection of working-class houses.

AUDENSHAW.—Discussions are proceeding regarding the provision of a secondary school for Audenshaw, Denton and Droylesden.

BARROWFORD.—Messrs. J. & J. H. Boothman, Brierfield, have purchased the Whittycroft Estate. It consists of six acres and will be opened out for building purposes.

BILLINGHAM.—Mr. H. Scotson is prepared to build about 20 houses adjoining Station-road, Billingham, provided the Council constructed the necessary sewer.

BINGLEY.—Plans passed: Pair of semi-detached houses in Beech-street, for Messrs. Dyer & Bailey.

BIRMINGHAM.—The Catholic congregation of Yardley are to secure a site for the erection of a new chapel.

BLACKBURN.—Plans approved by the T.C.: House, Billinge-avenue, by Mr. Harper Southworth; two houses, Assheton road, by Mr. Harper Southworth; two houses, Assheton-road, by Mr. Harper Southworth; four houses, Brindle-street, by Messrs. D. E. Critchley & Co.; three bungalows, Parsonage-road, by Mr. J. Ashworth.

BLACKPOOL.—Plans passed by the T.C.: Two houses, Briercliffe-avenue, —. Priestley; two bungalows, Alexandra-road, Bispham, Pilling, France & Co.; two houses, Cleator-avenue, G. Hodgson; six houses, Abbey-road, Kay & Fisher; house, Leamington-road, P. Round; bungalow, Burgate, H. Walton; stables and house, Boothley-road, Blackpool Co-operative Society, Ltd.; two houses, Harris-avenue, Nuttall & Taylor; three houses, Layton-lane, Threlfall, Midgley & Whiteside; seven houses, Warbreck Hill-road and Calder-road, W. Yates; six houses, Wembley-avenue, R. Lancaster & Sons (Cleveleys), Ltd.; three houses, Bispham-road, R. E. Fogg; two houses, Cameron-avenue, Mrs. W. Fletcher; bungalow, Layton-lane, W. Carew; two houses, Vicarage-lane, A. Rothwell; bungalow, off Whitegate-drive, J. E. Cardwell; two bungalows, Little Bispham-road, Dawson & Fielden; four houses, Crosland-road, Hogarth & Poilard; three houses, Phyllis-avenue, Seddon & Eckersley; house, Boothroyden, W. Winstanley; two houses, Sidney-avenue, T. Brierley; house, Preston New-road, Potts & Pickford; four houses, Durley-road, L. Hodgkinson; two bungalows, Romney-avenue, J. Todd; four houses, Kenilworth-gardens, J. A. Shepherd and others; four houses, Halifax-road, E. R. Grimshaw; two houses, Briercliffe-avenue, —. Metcalfe; four houses, Hawes Side-lane, —. Rider; six bungalows, Roseacre, A. Fletcher; bungalow, Roseacre, —. Ainscough; six bungalows, Roseacre, —. Harrison; 16 houses, Mayfield-avenue, J. W. Clarkson; four houses, Stopford-avenue, J. Walton.

BOSTON.—The R.D.C. has agreed to contribute £400 towards a new bridge at Chapel Hill. The bridge is estimated to cost £3,700.

BOURNEMOUTH.—Plans passed by T.C.: Joinery works, Heytesbury-road, Messrs. The Hampshire Shopfitting Co.; "Richmond Hotel," Charminster-road, Messrs. Strong & Co.; house, Namu-road, Mr. E. T. Green; house, Irving-road, Mr. E. Wood; house, Stokewood-road, Mr. J. W. Davis; house, King Edward-avenue, Mr. F. J. Whittle; house, Endfield-road, Messrs. F. Hoare & Sons; house, Ophir-road, Mr. A. D. Lambert; house and shop, Wimborne-road, Miss L. Swan; house, St. Ledger's-road, Mr. H. B. Long; house, corner Southhill and Wynyard-roads, Mr. F. A. Cole; house, Crichel-road, Mr. F. Bowden; house, Cowper-road, Mr. C. K. Habgood; house, De Lisle-road, Mr. W. Greenwell; house, De Lisle-road, Mr. W. Greenwell; two houses, Kimberley-road, Messrs. Griffiths & Eady; house, Horsa-road, Mr. L. C. Day; two houses, Ensbury Park-road, Mr. A. E. Bolton; house, Rowena-road, Mr. F. G. Troke; house, Egerton-road, Mr. C. V. Miller; house, Tuckton-road, Mr. H. J. Cutler; house, Westfield-road, Mr. S. A. Wood; house, De Lisle-road, Mr. A. R. Watts; house, Namu-road, Mr. E. W. Hayter; house, Browning-avenue, Mr. H. Solomon; house, St. Ledger's-road, Mrs. A. Beardsley; two houses, Carbery-avenue, Mr. J. Scott; house, Queen's Park-avenue, Mr. J. Moody; house, corner Charminster and Strouden roads, Mr. W. Carpenter; pair of houses and shops, corner Markham and Bemister roads, Mr. F. Richards; two houses, Branksome Wood-road, Mr. A. L. Cox; house, Cranleigh-road, Mr. M. G. Kellaway; two houses, Maclaren road, Mr. F. Moorman; two houses, Pickford-road, Messrs. E. & H. Joy; bungalow, Court-road, Mr. C. Newton; bungalow, Court-road, Mr. C. Newton; house and garage, St. Ledger's-road, Mr. J. F. Ellen.

BRENTWOOD.—The U.D.C. recommended the expenditure of £32,900 on the erection of a new secondary school for girls.

BRIDGEND.—The Cottage Hospital Committee has considered alternative proposals for a new hospital, the schemes submitted varying in estimated cost from £12,500 to £22,000.

BRIGHOUSE.—The T.C. has approved plans: Mrs. Percy Morris, bungalow, Lightcliffe-road; Mr. Wm. Jagger, two houses, Crowtrees-lane, Rastrick.—The T.C. has received sanction for the spending of £510 on the purchase of a site in Blackburn-road for an open-air school from the B.E.

BROXBOURNE.—The bridge across the New River at High-street is to be widened at a cost of £2,500.

BURNLEY.—The M.T. has intimated that it is prepared to make a grant of £2,442 in respect of the proposed widening of Hand Bridge by the T.C.

BURSLEM.—Plans passed: 10 houses, Moorland-road, for Mr. E. M. Sambrook; two houses, Leek-road, for Messrs. J. Moss & Son; two houses, Greasley-lane, for Mr. J. Wood.

CHELMSFORD.—The T.C. decided to instruct the Engineer to submit a scheme for making a road from the bridge in London-road to Springfield-road, through the Queen's Head Hotel, and also for the widening of Springfield-road from the entrance to High-street to the second bridge.

CHESTER.—The T.C. has approved plans for a house, Mr. R. R. Smith, Park-road, Curzon-park; house, Dr. Welch, Park-road, Curzon-park; house, Stock's-lane, for Mr. J. Beckett; bungalow, Mrs. Florence Butler; bungalow, Mr. W. A. Austin; house, Mr. Pottle; house, Mr. J. R. Jones.

COLCHESTER.—The Borough Surveyor of the T.C. submitted an estimate of the cost of the erection by direct labour of a further pair of parlour houses at £1,100, and a block of six non-parlour houses at £2,500, to complete a 50 authorised by the M.H., to whom application for sanction of the requisite loan is to be made.

COULSDON.—The U.D.C. is considering the purchase of 3½ acres at a cost of about £500, to enlarge the memorial ground.

DARLINGTON.—Plans passed by the T.C.: Four houses, Neasham-road, and house, Pierremont-gardens, for J. E. Chilton; four houses, Longfield-road, for H. B. Richardson; house, Dene-grove, for Reeve & Catterick.

DORCHESTER.—The R.D.C. has received the M.T. approval of a grant of £1,116 towards the estimated cost of surfacing certain roads in the rural district.

DROXFORD.—Plans passed by R.D.C.: Conversion of building to cottage, Swanmore, for C. H. House & Son.

DUNDEE.—Plans and sections of proposed new buildings, &c., lodged at the office of the City Engineer: Bank-avenue, house, for Robert R. Watt; Harrow-street, cottage, for Mrs. Rettie; Hyndford-street, house, for W. M. Dick; Jedburgh-road, cottage, for John Cree; Loons-road, Johnston-avenue, and Clepington-road, semi-detached cottages, for the Dundee T.C.; Montague-street, Barnhill, villas, for James A. Roberts.

DURHAM.—Plans passed by T.C.: A. Daykin, house, The Avenue; J. Dobson, picture hall, North-road.

EDMONTON.—The U.D.C. has received sanction from the M.T. for the Church-street widening. The cost will be as follows: C.C. £1,010; Ministry, £671; U.D.C. £1,017. The M.T. approved the following improvement works: Silver-street from main road to Silver-street station, estimated cost, £846; M.T. £423, C.C. £423. Ridge-avenue, Park-avenue and Village-road, estimated cost, £7,050; M.T. £3,525, C.C. £3,525. Silver-street from Sweet Briar-walk to Weir Hall, estimated cost, £3,472; M.T. £1,736, C.C. £868, U.D.C. £868. The Middlesex C.C. agreed to £250 towards improving the dangerous corner at Ridge-road and Church-street, estimated to cost £1,010. The C.C. have agreed to contribute £400 towards widening part of Church-street; it was decided to apply to the M.T. for their contribution of £28s., and to the M.H. for sanction to a loan of £446. The M.T. agreed to pay £292 for improving the dangerous corner at Bush Hill and Park-avenue; the C.C. will contribute £146. A scheme for laying-out the land off Bury-street and Galliard-road as a park was adopted by the U.D.C. The purchase money is £4,000. Some of the sub-schemes are: Men's lavatory, £300; public convenience, £750; shelter, £500; two pavilions, £400; open-air swimming bath, £7,000; surface water drainage scheme, £1,550. It has been decided to apply to the M.H. for sanction to borrow a loan of £4,100 for the purchase of the land; £18,700 to cover the cost.

ELLESMERE PORT AND WHITBY.—It has now been decided to erect a secondary school on a site to be obtained between Whitby and Little Sutton.—Plans passed: Transformer house for Mersey Power Co., Ltd.; shop for Wolverhampton Corrugated Iron Co.—Negotiations are in progress for the acquisition of additional land for recreation ground purposes.

ESHER AND DITTON.—The Council has 34 houses now in course of erection under the housing scheme, which provides for 48 houses. In addition to the

* See also our List of Contracts, Competitions, etc.

Council houses there are 70 houses and bungalows in course of erection by private enterprise.

EXMOUTH.—The U.D.C. approved a scheme to build 150 dwellings at Marboll State. The M.H. are being sought for permission to borrow money.

FARNHAM.—The Catholics are making a determined effort to secure funds for the erection of a church. The site has already been purchased from the U.D.C.

GARGRAVE.—A new police station is to be erected for the West Riding Joint Standing Committee of the C.C., at an estimated cost of £2,989.

GATESHEAD.—The T.C. is seeking the approval of the B.E. for the erection of a new school at King Edward-street, at an estimated cost of £21,678.

GLAMORGAN.—The Ystrad Mynach and District Welfare Committee has in hand a scheme for recreation grounds lay-out. The secretary of the committee is Mr. J. Jarman.—The Penybont R.D.C. is to erect 44 houses at Pyle and construct sewers at Pencoed.—The Ogmore and Garw U.D.C. is considering erecting a foot-bridge at Pontyrhyl, at an estimated cost of £1,200. A carriage bridge may also be erected at an estimated cost of £7,000. The Council has been informed by the International Coal Co. of their intention to erect 23 houses at Blaengarw.

GRAVESEND.—Plans passed by T.C.: Three houses, for Messrs. Jenkins, Enridge & Fooks; house, Singlewell-road, for Mr. H. A. Burton; house, Portland-avenue, for Mr. A. Hudson; houses, King's-drive, for Messrs. Whalin; two houses, Portland-avenue, for Messrs. G. E. Wallis & Co.; house, King's-drive, for Mr. G. Townsend; 15 houses, Cross-lane, for Mr. T. Bennett; 10 houses, King's-drive, for Messrs. Hopkins & Sons; five houses, Portland-avenue, for Messrs. Burvill & Stein.

GUILDFORD.—Plans passed by T.C.: House, South Hill, Messrs. Norris & Shattock, for Mr. G. H. Jacobs; house, Ennismore-avenue, Messrs. Hodgson, Lunn & Co., for Mr. Pettit; house, St. Omer Ridge, Mr. Capp, architect, for Mr. D. Grazebrook, 17, High-street; house, Stocton-road, for Mr. C. G. Jackson; house, Clandon-road, for Mr. H. Harlock; bungalow, Parkhurst-road, for Messrs. F. & F. H. Higgs, Ltd.; house, Hillier-road, for Messrs. Rutter & Co.; bungalow, Edgeborough-Estate, for Mr. D. Grazebrook; house, Mountside, for Messrs. Rutter & Co.; house, Clandon-road, for Mr. J. M. Holt; house, Avonmore-avenue, for Messrs. H. Frampton & Co.—The Council wish to purchase from the E.C. part of the Stoughton School playing field in Grange-road as a site for dwellings.

GUISELEY.—A site has been acquired for the erection of a new church, plans now being prepared.

HANLEY.—Plans passed: Bungalow, Heath-lane, for Mr. W. Salt; warehouse, Market-street, for Mr. L. P. Prime; house, Heath-lane, for Mr. H. Bell; two houses, Trentham-road, for Mr. W. Shone; eight houses, Milton-road, for Messrs. Shenton Bros.

HARPFIELD.—Plans passed by Stoke T.C.: Bungalow, Farm Estate, for Mr. J. Tinsley; two houses, Garden-place, for Mr. T. Horwill; two houses, Longfield-road, for Mr. T. Horwill.

HASTINGS.—Plans passed by T.C.: House, Filsham-road, for H. G. S. Lee, per Wakeford & Sons, architects.

HATFIELD.—The West Riding C.C. E.C. propose to provide a new elementary school for about 63 children.

HAYES.—The U.D.C. has made application to the M.H. for sanction of a loan of £3,000 for subsidies.

HESTON AND ISLEWORTH.—The U.D.C. are to spend £7,000 on a riverside garden.

HULL.—The Corporation has received sanction to proceed with the building of the art gallery and new fire station.

HUNSTANTON.—A sea wall is to be erected at a cost of £5,560.

HYLTON.—The Sunderland R.D.C. reports that plans have been approved by the Government for the construction of a bridge.

IPSWICH.—The T.C. propose erecting a mortuary on a site in Side-street; the cost is estimated at £1,600.

ISLEWORTH.—A new central receiving home for the Brentford B.G. is to be provided in Twickenham-road, at an estimated cost of £12,000 to £13,000. Plans have been submitted by Messrs. Dodge & Reid and were approved. Tenders are to be invited for carrying out the work subject to the approval of the M.H.

KENLEY.—Efforts are being made to purchase land in Lower-road for a children's playground.

KINGSTON.—The T.C. has been informed that the M.T. are prepared to make a grant of £1,392 towards the cost of widening London-road opposite Cambridge-road; this was agreed to.—The T.C. are applying for a loan of £41,000 for the new cattle market.

LEA VALLEY.—The M.T. has put in hand the arterial road work at the Viaduct. Tenders are being invited.

LEEDS.—The Corporation has arranged with the Leeds Church Extension Society to take over part of the site of St. Paulinus Church, Dewsbury-road, containing approximately 656 sq. yds., and required for the widening of the road.

LEICESTER.—The E.C. is considering a new site for the Wyggeston Girls' School.—The culverting of the watercourse at Wordsworth-road is recommended at cost of £2,148.

LONDON (CHELSEA).—The British Federation of University Women have inaugurated an endowment fund to enable Crosby Hall to be used as a residence for women who are studying at the London University. The scheme is estimated at £30,000.

LONDON (FULHAM).—A new park pavilion is to be erected by the B.C. The Council is borrowing £1,000.

LONDON (GREENWICH).—The B.C. has purchased an estate known as "The Twenty Acre Field," Blackheath, for £9,630, on which they will build 400 houses.

LONDON (GUNNERSBURY).—The railway bridge is to be widened.

LONDON (KENSINGTON).—The L.C.C. has agreed to sanction the borrowing by the B.C. of £24,200 in connection with the erection of houses comprising the third section of the St. Quintinh ousing scheme.—The L.C.C. propose providing a new public elementary school for about 768 children and capable of enlargement by 128 places, in North Kensington; the site of the proposed school is in Bevington-road.

LONDON (LEWISHAM).—The B.G. has decided to purchase, subject to the sanction of the M.H., property in Lewisham High-street, known as The Priory. The cost of the purchase will be £4,100, and it it proposed to erect there a new board room and offices.

LONDON (POPLAR).—The B.C. is applying for sanction to borrow £16,000 for the purchase of a site in Weston-street, required for the Electricity Department.

LONDON (SOUTHWARK).—Messrs. J. Lyons & Co., Ltd., propose to rebuild Nos. 345 and 348, Walworth-road. Negotiations are proceeding with the L.C.C. regarding the proposal to create an open space in the Grotto-place area.

LUTON.—Plans approved by the T.C.: H. F. J. Bottoms, two houses, Alexandra-avenue; Luton B.G., extensions, Tramp Ward, Union House, Dallow-road; W. M. Router, two houses, Carlton-crescent; J. Squires, house, Old Bedford-road; A. W. Oakley, ten houses, Dunstable-road; A. Mardle, four houses, Alexandra-avenue; E. J. Taylor, four houses, Biscot road; F. White, two houses, Colin-road; A. Tate, two houses, Stratford-road; J. Frost, nine houses, Holland-road; Luton Suburban Estates, Ltd., two new streets, New Bedford-road Estate, Argyle-avenue and Blenheim-crescent; W. Reeve, two houses, Holland-road; Electricity Dept., electricity sub-station, Turner's Knoll; J. T. Garrett, four houses, Farley-hill.

MAIDSTONE.—The Council has applied to the M.H. for sanction to sell to H.M. Postmaster-General, for £4,200, the site for the new Post Office in King-street; and to sell to Mrs. Howlett & Whitehead, for £1,050, the site for their new offices adjoining that to be sold to the Postmaster-General.

MANCHESTER.—The T.C. approved plans: Refacing transformer house, Lower Vickers-street and Sycamore-street, Miles Platting; D.I.C. house, Cross-street, Bank-street, and Half Moon-street; dedication plan and section of back street, Barrow Hill-road, Waterloo-road, Cheetham.

MEXBOROUGH.—The U.D.C. has received conditional approval for the erection of 40 houses from the M.H.

MIDDLESBROUGH.—A quarter-of-a-million pounds is the estimated cost of a new bridge over the Tees at Newport.

MONMOUTHSHIRE.—The County E.C. has obtained a site for erection of a school at Maesycymmer.—The Bedwellty U.D.C. is to lay out a new site for a cemetery.—The Pontllanfraith Welfare Committee proposes to acquire Ynyswen House and lands for conversion to a public institute.—The C.C. is to spend £150,000 on widening the main Newport-Cardiff road.

NEWCASTLE.—The City Council has received permission from the M.H. for an additional loan of £1,100 in respect to the erection of 142 houses at the Walker site.—It is proposed to erect a library at Scotswood, at a cost of £13,000.—A scheme has been prepared for the adaptation of the plunge bath hall at Byker Baths into a recreation hall, at a cost of £1,000.

NEWTON ABBOT.—Plans approved by the R.D.C.: Bungalow, Bishopsteignton, for Mr. H. Compton Arnold; house, Kingsteignton, for Mr. E. Best; flats, the Manor House, Widecombe, for Mr. E. G. Wetherall; six cottages, Kingsteignton, for Mr. S. Howe; bungalow, Trusham.

NORTH WICKFORD.—The U.D.C. passed plans: House, for Mr. W. C. Smith, at Stonea; bungalow, for Messrs. H. & A. Redhead, at Wimblington.

NOTTINGHAM.—A bacon factory for the area at an estimated cost, to build, equip, and run, of about £25,000, is being proposed by the South Notts Farmers' Union.

PONTEFRACT.—Plans passed by R.D.C.: House at Beal, for Mrs. H. Sherrard; 18 houses at Westfield, Glasshoughton, for Messrs. Powell Bros.; house at Brotherton, for Mr. Wales.

PONTYPRIDD.—The U.D.C. is to erect a new school at Treforest.

PRESTON.—The T.C. have purchased a plot of land adjoining Ribbleton-avenue for £2,750.—It has been decided to recommend the acceptance of a tender for a sum of £1,050 in regard to a contract for stone pillars for the entrance gates at the cemetery.

PURLEY.—The U.D.C. has purchased land at Higher-drive for £5,700 for a recreation ground.

RADSTOCK.—The M.H. has approved the proposal of the R.D.C. to erect a further 14 houses. Sanctions are to be obtained for £4,942 for the erection of the houses and £142 for sewer works.

ROTHERHAM.—The T.C. recommend the rebuilding of the old Gaol Bridge. The expenditure involved is estimated at between £80,000 and £90,000, and towards this sum it is anticipated that the M.H. will make a grant of about £40,000. The Borough Engineer has been instructed to obtain tenders for carrying out the work.

ROTHWELL.—The U.D.C. has been informed that the M.T. has agreed to a start being made with the proposed Longthorpe-lane improvement, and to pay half of the approved estimate of £2,865.—Plans are being prepared for the erection of four new houses on the site of Miss Schofield's condemned houses at Carlton.—Sanction has been received to the borrowing of £13,684 for the erection of twelve houses each on the Thorpe, Lofthouse, and Carlton sites.

RUGBY.—The B.G. has accepted, subject to the consent of the M.H., a tender for the extension to the Poor Law Infirmary amounting to £9,632.

ST. ASAPH.—The R.D.C. approached several P.C.'s regarding housing. The results obtained were Dyserth, twelve; Melliden, twelve; Bodfari, six; and Waen, four.

ST. THOMAS.—The R.D.C. have a scheme of Mr. C. Warren (Exeter), to establish a garden city of 150 houses on the Birchy Barton estate, near Heavitree.

SANDERSTEAD.—Plans passed by U.D.C.: Six houses, Britton Hill-road, for Mr. Thomas; two houses, Mayfield-road, for Mr. J. Webster.

SCARBOROUGH.—The M.H. has sanctioned the borrowing of £3,000 by the Corporation for the purpose of providing new public conveniences at Sandside.

SHEFFIELD.—Plans passed by the T.C.: Two houses, Ford-road, for Messrs. W. J. Richardson & E. Hill; house, Cobnar-road, for Mrs. R. T. Dyson; two houses, Louth-road, for Messrs. Simpson Bros.; bungalow, Seagrave-road, for Mr. A. Tate; two houses, Firth Park-crescent, for Mr. T. Pye; house, School Green-lane, for Mr. E. F. Cliff; two houses, Main-road, Handsworth, for Mr. G. Payling; ten houses, Sandygate-road and Watt-lane, for Mr. J. Samuel; four houses and shops, Ringinglow and Bents Green-roads, for Messrs. W. Malthouse, Ltd.; house, Don-avenue, for Mr. G. Hardwick; bungalow, Watt-lane, for Mr. P. Parry; two houses, Stubbin-lane, Richmond, for Mr. J. Kennedy; bungalow, Abbey-lane, for Mr. E. Rosten; four bungalows, Rundle-road, for Mr. W. Ramsay; two bungalows, Folds-crescent, for Mr. A. J. Mackenzie; two houses, Archibald-road, for Mr. Atkinson; house, Pearl-street, for Messrs. Wostinholm & Stevenson.

SOUTH SHIELDS.—Plans passed: Mr. F. W. Newby, for Mr. R. H. Brown, block of business premises, four garages, and five shops with two dwelling houses above at corner of Prince Edward-road and West-avenue, Harton.

THAMES DITTON.—Plans have been submitted for the re-building of the "Lamb and Star." As the site of these premises forms part of a proposed road which is being considered in connection with the re-building of Hampton Court bridge, the Council have decided to explain the circumstances to the M.H. and to the County Surveyor, in order that their observations might be obtained.

TWICKENHAM.—The U.D.C. are proposing to purchase the Green for a sanitary convenience.—The erection of houses is being proposed.—There is every likelihood of a clinic being erected.—Messrs. Ralph Knott and E. S. Collins have submitted a sketch plan for the alterations of Radnor House in connection with a scheme for the formation of a pleasure ground. The M.T. has made a grant of 50 per cent., but not exceeding £6,250, towards the cost of widening Cross Deep to 50 ft. between King-street and Pope's-grove.—The M.H. has given formal sanction to the borrowing of £1,360 for the widening and improvement of Nelson-road, from Hounslow-road to near Hospital Bridge-road. The M.H. has made a grant of £237 for the improvement of the corners at the junction of Stains Hospital Bridge and Sixth Cross-roads.

UXBRIDGE.—The U.D.C. proposes the construction of a reservoir on land adjoining the common. The Infant Welfare Centre is to be enlarged and tenders are to be invited forthwith for the work.

WAKEFIELD.—The R.D.C. approved plans of the lay-out of the proposed sixteen Council houses at Upper-lane, Netherton.—Plans passed: Two houses Denby Dale-road, Crigglestone, for Mr. J. Dilks.

WALTHAMSTOW.—Plans approved by the U.D.C. Classroom and heating chamber, Forest School, Rev R. C. Guy; shop and dwelling, Winchester-road, W. E. Penny.

WANDSWORTH.—Plans: Mr. R. Mansell, six houses, Sutherland-grove, Southfield; Messrs. Holloway Bros. (London), Ltd., two houses, Ellerton-road, Springfield; Mr. H. G. Parker, house, Glenburnie-road, Balham; Messrs. North, Robin & Wilsdon, eight lock-up shops on land at junction of Mitcham-road and Bickersteth-road, Tooting; Messrs. H. S. Goutland & F. Metcalf, five houses, Albert-road, Southfield; Mr. C. A. Sharp, house and garage, Kingsmead-road, Streatham; Mr. J. J. Taylor, 14 houses, Atkins-road, Clapham South; Mr. W. J. F. Gillett, seven houses, Voss-court, Streatham; Messrs. C. Milner & Son, four houses, Tankerville-road, Streatham; Messrs. William Willett, Ltd., house, in new road on Dover House Estate, westward of Dover House-road, Putney; Messrs. F. W. & A. E. Kerven, five houses, Hill House-road, Streatham; Mr. F. H. Clarke, house, Hopton-road, Streatham; Messrs. J. Harrison & Co., hall, Ravenna-road, Putney; Messrs. Belfrage, Saville & Hooper, six houses, Sutherland-grove, Southfield; Mr. C. S. Banks, house, King's-avenue, Clapham South, and house, Clarence-road, Clapham South; Messrs. Blyth, Ltd., six houses, Viewfield-road, Southfield; Mr. T. Collingwood, two houses, Glenburnie-road, Balham; Messrs. Rowling Bros., Ltd., five lock-up garages at the Rawcester Athletic Association Ground, Wimbledon Park-road, Southfield; Messrs. G. Glover & Sons, house, Leigham Court-road, Streatham.

WANTAGE.—The R.D.C. are to erect six houses at West Hendred.—Mr. J. W. Harris was instructed to advertise for tenders for carrying out the Harwell drainage scheme.

WEST RIDING OF YORK.—The E.C. decided to purchase land for the new middle school at South Kirkby, Moorthorpe.—The authority are to provide a new Council school for 450 children at Shitlington, to replace the existing Church of England school.—Subject to the approval of the B.E., a scheme of permanent extensions to the Ossett Grammar School was adopted, the estimated cost to be £22,000 for buildings and £3,000 for equipment.

WREXHAM.—Application is to be made by the R.D.C. for sanction to a loan of £49,720, for the erection of 90 houses, purchase of land, &c. The cost of repairing 8¼ miles of roads, prior to transfer to the C.C., is estimated at £22,865, towards which the M.T. has granted £17,149.

WYKE (BRADFORD).—A Corporation tramway shelter is to be erected adjacent to the recreation ground, at an estimated cost of £140.

YORK.—The M.T. having considered preliminary plans of the proposed road and bridge over the River Ouse at Clifton, desires to know whether it is the intention of the Council to proceed with the construction of the whole of the work, including the bridge. The Committee recommend that the work be proceeded with at an estimated cost of £73,500, exclusive of land.—It is proposed to enlarge St. Helen's-square and Davygate.

FIRE.

BANGOR.—Messrs. Baird Bros.' garage was burnt out. The damage is estimated at £30,000.

PRICES CURRENT OF MATERIALS

[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry.—Ed.]

BRICKS, &c.

Per 1,000 Alongside, in River Thames up to London Bridge.

	£ s. d.
Best Stocks	4 3 6
Second Hard Stocks	3 18 6

Per 1,000. Delivered at London Goods Stations.

	£ s. d.		£ s. d.
Fjettons, at King's Cross	2 13 3	Best Blue Pressed Staffs.	9 5 0
Do. grooved for plaster	2 15 3	Do. Bullnose ..	9 15 0
Do. Bullnose ..	3 8 3	Blue Wire Cuts	7 5 0

Best Stourbridge Fire brick:—

2½ in.	8 11 0	3 in.	10 3 0

GLAZED BRICKS—

Best White Ivory, and Salt Glazed Stretchers ..	23 0 0	D'ble Str'tch'rs	31 10 0
		D'ble Headers	28 10 0
		One Side and two Ends ..	32 10 0
Headers.....	22 10 0	Two Sides and one End	33 10 0
Quoins. Bullnose and 4½in. Flats	29 10 0	Splays and Squints	31 0 0

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white. Other colours, Hard Glaze, £5 10s. extra over white.

BREEZE CONCRETE SLABS.

Delivered London.

	s. d.		s. d.
2 in. per yd. super	2 1	3 in. per yd. super	2 11
2½ in. "	2 6	4 in. "	3 6

	s. d.	
Thames Ballast	10 6	per yard.
Pit Sand	14 9	" "
Thames Sand	15 6	" "
Best Washed Sand.....	15 6	" "
½ in. Shingle for Ferro-Concrete	14 0	" "
¾ in. "	15 0	" "
¾ in. Broken Brick.....	10 6	" "
Pan Breeze	7 6	" "

delivered 2 miles radius Paddington.

Per ton delivered in London area in full van loads.

Best Portland Cement, British Standard Specification Test £2 18 0 to £3 3 6	
51/- alongside at Vauxhall in 80-ton lots.	
Ferrocrete per ton extra on above.....	0 10 0
Super Cement	4 8 0
Roman Cement	8 15 0
Parian Cement	5 15 0
Keene's Cement, White.....	5 15 0
" Pink	5 10 0
Plaster, Coarse, Pink	3 0 0
" " White	3 12 6
" Fine	5 12 0
Sirapite, Coarse	3 9 0
" Finish	3 17 0
Grey Stone Lime	2 11 9
Chalk Lime	2 11 9
Best Ground Blue Lias Lime.....	2 4 6
Hair	17 0 0
Granite Chippings	1 12 0

NOTE.—Sacks are charged 1s. 9d. each and credited 1s. 6d. if returned in good condition within three months, carr. pd.

Stourbridge Fireclay in s'cks 35s. 0d. Per ton at rly. dpt.

STONE.

	s. d.
BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R., per ft. cube.....	2 9½
Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R., per ft. cube.....	2 11½
PORTLAND STONE—	
Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L. & S.W.R., South Lambeth Station, G.W.R., and Westbourne Park, Paddington, G.W.R., per ft. cube.....	4 4
Do. do. delivered on road wagons at above stations, per ft. cube.....	4 5
White basebed, 3d. per ft. cube extra.	
NOTE.—1d. per ft. cube extra for every foot over 20 ft. *average*, and ½d. beyond 30 ft.	
HOPTON-WOOD STONE.	
Delivered at any Goods Station, London.	
Small random blocks, up to 10 ft. cube. Per ft. cube	7/-
Random blocks from 10 ft. and over "	17/-
Sawn two sides ..... "	27/-
Sawn three or four sides ..... "	32/-
YORK STONE, BLUE—*Robin Hood Quality.*	s. d.
Delivered at any Goods Station London.	
6 in. sawn two sides landings to sizes (under 30 ft. super.)..... Per Ft. Super	5 6
6 in. rubbed two sides, ditto..... "	6 0
3 in. sawn two sides slabs (random sizes) "	2 3½
2 in. to 2½ in. sawn one side slabs (random sizes) ..... "	1 6½
1½ in. to 2 in. ditto, ditto ..... "	1 4
HARD YORK—	
Delivered at any Goods Station London.	
Scappled random blocks.....Per Ft. Cube	6 3
6 in. sawn two sides landing to sizes (under 40 ft. super.)..... Per Ft. Super	5 1½
6 in. rubbed two sides ditto ..... "	6 1½
4 in. sawn two sides slabs (random sizes) "	2 10
3 in. ditto. ditto "	2 1½
2 in. self-faced random flags..Per Yard Super	9 0

ARTIFICIAL STONE.

Delivered in London Area in full van loads, per ft. cube:—Plain, 6s. 6d.; Moulded, 7s. 9d.; Cills, 8s. 3d.

WOOD.

GOOD BUILDING DEAL.

Inches.	per stan.	Inches.	per stan.
4 × 11	£32 0	3 × 6	£23 0
4 × 9	28 0	3 × 11	28 0
4 × 8	26 0	2 × 11	28 0
4 × 7	26 0	3 × 9	26 0
4 × 6	24 0	2½ × 9	26 0
3 × 7	23 0	3 × 4½	24 0
2½ × 7	23 0	3 × 4	24 0

PLANED BOARDS.

1 × 11	£34 10	1 × 9	£32 0

WOOD (*Continued*).

PLAIN EDGE FLOORING.

Inches.	per sq.	Inches.	per sq.
⅝	21/-	1¼	32/6
¾	23/-	1½	37/6
1	25/-		

TONGUED AND GROOVED FLOORING.

Inches.	per sq.
1	25/-
1¼	32/6
1½	37/6

MATCHINGS (BEST).

Inches	per sq.
½	16/6
⅝	20/-
¾	25/-

BATTENS

Inches	s. d.
½ × 2	2 6 per 100 ft.

SAWN LATHS.

Per bundle			0 2
Dry Wainscot Oak, per ft. super, as inch	0 2 0	to	0 2 6
¼ in. do.	0 1 6	to	0 2 0
Dry Mahogany—Honduras, Tabasco, African, per ft. super, as inch	0 1 9	to	0 2 6
Cuba Mahogany	0 3 0	to	0 3 6
Teak (Rangoon, Moulmein or Java), per ft. cube	0 14 0	to	—
American Whitewood planks, per ft. cube ..	0 12 0	to	0 14 0
Best Scotch Glue, per cwt.	4 10 0	to	—
Liquid Glue, per cwt. ..	4 7 0	to	5 10 0

SLATES.

1st quality slates from Bangor or Portmadoc carriage paid in full truck loads to London Rate Station. Per 1,000 of 1,200.

	£ s. d.		£ s. d.
24 by 12.....	37 12 6	18 by 10	21 2 6
22 by 12	34 0 0	18 by 9.....	18 12 6
22 by 11.....	31 5 0	16 by 10	17 12 6
20 by 12.....	29 15 0	16 by 8	13 15 0
20 by 10.....	25 12 6		

TILES.

Per 1,000 f.o.r. London.

	£ s. d.
Best machine-made tiles from Broseley or Staffordshire district	5 12 6
Ditto hand made ditto	5 17 6
Ornamental ditto	6 2 6
Hip and valley tiles (per dozen) { Hand made	0 9 6
Machine made	0 9 0

METALS.

JOISTS, GIRDERS, &c., TO LONDON STATION PER TON—

	£ s. d.
R. S. Joists, cut and fitted	13 10 0
Plain Compound Girders	15 10 0
Stanchions	17 10 0
In Roof Work	20 10 0

MILD STEEL ROUNDS.

To London Station, per ton.

Diameter.	£ s. d.	Diameter.	£ s. d.
¼ in.	16 10 0	⅜ in. to ½ in...	13 10 0
⅛ in.	14 10 0	⅝ in. to 2½ in...	13 0 0

WROUGHT-IRON TUBES AND FITTINGS—

(Discount off List for lot of not less than £7 net value delivered direct from Works, 2½ per cent. less above gross discounts, carriage forward if sent from London Stocks.)

	Tubes. All sizes.	Fittings. ½"&up.	Fittings. ¾"to1" inclusive.	Flanges ½"&up.	Flanges ¾"to1" inclusive
Black Gas....	50 %	50 %	47½ %	60 %	57½ %
Blue Water ..	45 %	45 %	42½ %	55 %	52½ %
Red Steam ..	40 %	40 %	37½ %	50 %	47½ %
Galv'd Gas ..	35 %	40 %	37½ %	50 %	47½ %
" Water.	28½ %	35 %	32½ %	45 %	42½ %
" Steam	22½ %	30 %	27½ %	40 %	37½ %

C.I. HALF-ROUND GUTTERS—London Prices, ex Works.

Per yd. in 6 ft. lengths.	Gutters.	Angles and Nozzles.	Stop Ends.
3 in.....	1/1½	11d.	3½d.
3½ in.	1/2½	1/0½	3½d.
4 in.....	1/4	1/1½	3½d.
4½ in.	1/5½	1/4	4d.
5 in.....	1/7½	1/5½	5d.

O.G. GUTTERS.

3 in.....	1/6½	1/2½	3½d.
3½ in.	1/6½	1/2½	3½d.
4 in.....	1/7½	1/4	3½d.
4½ in.	1/9½	1/6½	4d.
5 in.....	2/1½	1/9	5d.

RAIN-WATER PIPES, &c.

Per yd. in 6 fts.	Pipe.	Bends, stock angles.	Branches, stock angles.
2 in. plain	1/7½	1/1½	1/8
2½ in. "	1/9½	1/4	2/0½
3 in. "	2/1½	1/8	2/8½
3½ in. "	2/6½	1/11½	2/10½
4 in. "	2/11½	2/4½	3/5½

L.C.C. COATED SOIL PIPES—London Prices ex works.

	Pipe.	Bends, stock angles.	Branches, stock angles.
	s. d.	s. d.	s. d.
2 in. per yd. in 6fts plain	3 0½	2 2½	2 8
2½ in. "	3 6½	2 5½	3 3½
3 in. "	4 2½	2 8	4 0½
3½ in. "	4 7	3 3½	4 8½
4 in. "	5 1	3 9½	5 5

L.C.C. COATED DRAIN PIPES—London Prices ex works.

	Pipe.	Bends, stock angles.	Branches stock angles.
	s. d.	s. d.	s. d.
3 in. per yd. in 9ft. lengths	4 9	5 8	8 10
4 in. " "	6 2	6 8	11 4
5 in. " "	7 8	11 6	18 2
6 in. " "	8 10	14 4	23 5

Per ton in London.

	£ s. d.		£ s. d.
IRON—			
Common Bars.....	13 10 0	to	14 10 0
Staffordshire Crown Bars—good merchant quality	14 10 0		15 10 0
Staffordshire "Marked Bars"	17 0 0	..	18 0 0
Mild Steel Bars	12 0 0	..	13 0 0

METALS (*Continued*).

	£ s. d.		£ s. d.
Steel Bars, Ferro-Concrete quality, basis price	12 10 0	..	13 10 0
Hoop iron, basis price	16 10 0	..	17 10 0
Galvanised	31 0 0	..	32 0 0
Soft Steel Sheets, Black—			
Ordinary sizes to 20 g....	14 10 0	..	15 10 0
" " 24 g....	15 10 0	..	16 10 0
" " 26 g....	17 10 0	..	18 10 0
Sheets Flat Best Soft Steel, C.R. & C.A. quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g....	21 0 0	..	22 10 0
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 22 g. and 24 g.....	22 10 0	..	23 10 0
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 26 g...	24 10 0	..	26 10 0
Flat and Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 9 ft. to 20 g.	20 10 0	..	21 10 0
Ordinary sizes, 6 ft. to 9 ft. to 22 g. and 24 g.	21 0 0	..	22 0 0
Ordinary sizes, 6 ft. to 9 ft. to 26 g.	23 0 0	..	24 0 0
Sheets Galvanised Flat, Best quality—			
Best Soft Steel Sheets, 6ft. by 2ft. to 3ft. to 20g. and thicker ..	23 10 0	..	24 10 0
Best Soft Steel Sheets, 22 g. and 24 g. ..	24 10 0	..	26 10 0
Best Soft Steel Sheets, 26 g.	26 0 0	..	27 0 0
	20 10 0	..	22 0 0
Cut Nails, 3in. to 6 in. (under 3in. usual trade extras.)			

METAL WINDOWS—Standard sizes suitable for complete houses, including all fittings, painting two coats, and delivery to job, average price about 1/4 to 1/7 per foot super.

LEAD, &c.

(Delivered in London.)	£ s. d.
LEAD—Sheet, English, 4 lb. and up	44 0 0
Pipe in coils	44 10 0
Soil Pipe	47 10 0
Compo pipe.....	50 10 0

NOTE—Country delivery, 30s. per ton extra; lots under 3 cwt., 2s. per cwt. extra and over 3cwt. and under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes, 2s. cwt. extra.

Old lead, ex London area, at Mills ..... per ton	31 0 0	..	—
Do., ex country, carriage forward ..... per ton	32 0 0	..	—

PLUMBERS' BRASS WORK.

Delivered in London.

NEW RIVER PATTERN SCREW DOWN BIB COCKS FOR IRON.

½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
29/-	45/-	76/-	153/-	246/-	510/- per doz.

NEW RIVER PATTERN SCREW DOWN STOP COCKS AND UNIONS.

½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
41/6	62/-	92/-	174/-	300/-	588/- per doz.

NEW RIVER PATTERN SCREW DOWN MAIN FERRULES.

½ in.	¾ in.	1 in.
59/6	60/-	116/6 per doz.

CAPS AND SCREWS.

1¼ in.	1½ in.	2 in.	3 in.	3½ in.	4 in.
7/6	10/-	14/-	23/-	30/-	42/- per doz.

DOUBLE NUT BOILER SCREWS.

½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2in.
7/6	11/6	17/-	29/-	36/-	63/- per doz.

BRASS SLEEVES.

1¼ in.	2 in.	3 in.	3½ in.	4 in.
10/-	12/-	20/-	24/-	31/- per doz.

NEW RIVER PATTERN CROYDON BALL VALVES, S.P

½ in.	¾ in.	1 in.	1¼ in.	1½ in.
35/-	56/-	98/-	162/-	228/- per doz.

DRAWN LEAD P. & S. TRAPS WITH BRASS CLEANING SCREW.

	1½ in.	1½ in.	2 in.	3 in.
8 lbs. P. traps ..	33/-	41/-	56/-	101/- per doz.
8 lbs. S. traps ..	35/-	45/-	66/-	126/- "

COPPER—	£ s. d.	
Strong Sheet ....per lb.	0 2 3	.. —
Thin " .... "	0 2 4	.. —
Copper nails .... "	0 2 3	.. —
Copper wire .... "	0 2 4	.. —
TIN—English Ingots "	0 2 6	.. —
SOLDER—Plumbers' "	0 1 2	.. —
Tinmen's ..... "	0 1 4	.. —
Blowpipe ..... "	0 1 5	.. —

PAINTS, &c.

	£ s. d
Raw Linseed Oil, in pipes .....per gallon	0 4 0
" " " in barrels .... "	0 4 2
" " " in drums .... "	0 4 5
Boiled " " in barrels .... "	0 4 5
" " " in drums .... "	0 4 8
Turpentine in barrels ..... "	0 5 9
" in drums (10 gall.) .. "	0 6 0
Genuine Ground English White Lead, per ton (In not less than 5 cwt. casks.)	53 10 0
GENUINE WHITE LEAD PAINT—	
"Father Thames," "Nine Elms," "Park," "Supremus," "St. Paul's," "Spedol" and other best brands (in 14 lb. tins) not less than 5 cwt. lots per ton delivered	75 15 0
Red Lead, Dry (packages extra)....per ton	52 0 0
Best Linseed Oil Putty.....per cwt.	0 16 0
Filcool .....per cwt.	0 15 6
Size. XD Quality.....fkn.	0 3 6

[*Continued on next page.*]

* The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

PRICES CURRENT OF MATERIALS (*contd.*)

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

	Per Ft.		Per Ft.
15 oz. fourths ..	3½d.	32 oz. fourths	8½d.
15 „ thirds	4½d.	32 „ thirds	10½d.
21 „ fourths ..	5d.	Obscured Sheet, 15 oz.	4d.
21 „ thirds	6½d.	„ „ 21 „	5½d.
26 „ fourths ..	6d.	Fluted 15oz. 6½d., 21oz.	9½d.
26 „ thirds	7½d.	En'lled 15oz. 5½d., 21 oz	7½d.

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	Per Ft.
⅛ Rolled plate	4½d.
3/16 Rough rolled	5½d
¼ Rough rolled	6½d
Figured Rolled, Oxford Rolled, Baltic, Oceanic, Arctic, Stippolyte, and small and large Flemish white	6½d.
Ditto, tinted	9d.
Rolled Sheet	6d.
White Rolled Cathedral	5½d.
Tinted do.	7½d

Cast Plate is same price as rough rolled.

VARNISHES, &c.

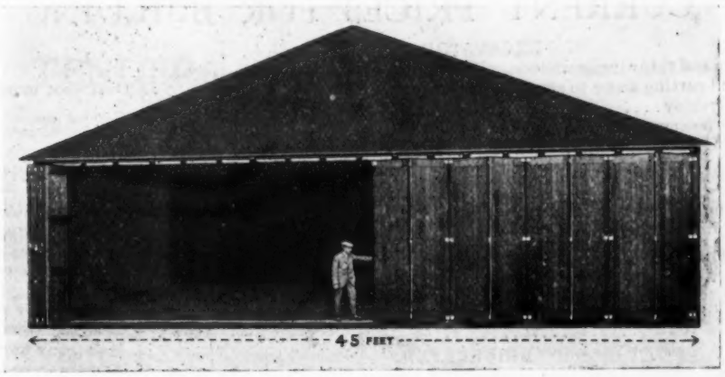
		Per gallon £ s. d.
Oak Varnish	Outside	0 14 0
Fine ditto	ditto	0 16 0
Fine Copal	ditto	0 18 0
Pale Copal	ditto	1 0 0
Pale Copal Carriage	ditto	1 4 0
Best Ditto	ditto	1 12 0
Floor Varnish	Inside	0 18 0
Fine Pale Paper	ditto	0 18 0
Fine Copal Cabinet	ditto	1 2 0
Fine Copal Flatting	ditto	1 0 0
Hard Drying Oak.....	ditto	0 18 0
Fine Hard Drying Oak	ditto	0 19 0
Fine Copal Varnish	ditto	1 0 0
Pale ditto	ditto	1 2 0
Best ditto	ditto	1 12 0
Best Japan Gold Size		0 10 0
Best Black Japan		0 10 0
Oak and Mahogany Stain (water).....		0 12 0
Brunswick Black.....		0 7 0
Berlin Black		0 14 0
Knotting (patent)		1 5 0
French and Brush Polish		0 17 0
Liquid Dryers in Terebine.....		0 9 0
Cuirass Black Enamel.....		0 7 0

New Hotel, Weston-super-Mare.

A new Grand Central Hotel is to be erected shortly by Messrs. T. Macfarlane & Sons, Ltd. The whole scheme will contain 150 rooms. The architects are Sir Henry Tanner & Sons.

Manchester College of Technology.

The building trades teachers from Lancashire and Cheshire are at present considering. at the Manchester College of Technology, recent developments in the building industry that make for greater efficiency of management and more skilled craftsmanship. A report is to be given on the work done during the year by a joint committee composed of members of the Manchester branch of the Institute of Builders and of building trades teachers, and formed after a conference held in Manchester in October last year. Mr. J. W. Riley, of Rochdale, will introduce a discussion on building examinations and the necessity for national certificates. Mr. F. E. Drury, of Manchester, will open with the consideration of training for higher positions in the building industry, and Mr. F. W. Anderson, of Bolton, will deal with the introduction of trade courses.



Tangent Door.

NEW INVENTIONS

Folding Doors.

A new system of folding doors has been put on the market by Messrs. P. C. Henderson, Ltd., of Tangent Works, Barking, E., and is known as the "Tangent Folding Door Gear." As will be seen by the illustration on this page, the gear only is supported, while the screen is made by a joiner. This design and many others are fully illustrated and described in Messrs. Henderson's publication, No. 24.

A New Curtain Runner.

A system of wheeled runners moving on a flexible metal rail for carrying curtains has been put on the market by Messrs. Wilson & Kingsley, Ltd., of 271, Goswell-road, E.C.1. It is claimed that with this device the life of curtains is considerably prolonged, as "dragging" when moving the curtains to and fro is eliminated. A rail is secured to the window frame, and to this rail the curtains are suspended from hooks attached to a wheel which runs along the rail. We are informed that each wheel attachment can support a weight of 112 lbs., and thus the heaviest curtains may be carried. The rail may be easily bent to follow the shape of any wall or window, and when fixed to windows one side may be made to overlap the other so that curtains are overlapped at the centre. We are informed that this curtain rail, called the "Rolo," has been installed in many public buildings and leading hotels throughout the country.

New Wolverhampton Factory.

Messrs. Courtaulds, Ltd., have decided to proceed with the erection of a factory at Wolverhampton in Hordern-road, adjoining the Dunstall Park Racecourse. The plans show that the complete factory will cover something like forty acres of land, and it is understood that operations are to be put in hand very shortly.

TRADE NEWS

A Canadian company who manufacture veneered doors, and also a large variety of stock white pine doors with solid sticking, are in a position to undertake regular export trade, and invite inquiries from British importers. Full information may be obtained from the Canadian Government Trade Commissioner's Office, Portland House, 73, Basinghall-street, London, E.C.2.

We have received from Messrs. D. & J. Tullis, Ltd., Clydebank, a copy of their latest pamphlet, illustrating and describing their "London Imperial" ironing machine. It is claimed this machine has completely revolutionised the laundry industry, and that not only is the output equal to, if not greater than, any other design of multiple machine on the market, but what is equally important, the finish on the linen has not been sacrificed. The makers state in designing their 1924 model they hav aimed at keeping it as simple as possible. There is, it is stated, no return apron necessitating constant expert supervision; and that thee mechanism has been so constructed that it cannot get out of order.

Messrs. Nicholls & Clarke, Ltd., of High-street, Shoreditch, E.1, having recently remodelled and decorated their showrooms, have now issued two catalogues of their goods. No. 20 gives a comprehensive list of general ironmongery and sanitary fittings, &c., fully priced, and illustrated, from which a selection of fitments may be made for any class of building whether commercial or domestic. It is a useful volume, and should be in every builder's office. Catalogue No. 21 gives coloured illustrations of leaded lights, some simple in character, others more elaborate in design. Sections of leads, casement handles, wrought steel casements, &c., are also illustrated fully and drawn to scale. The leaded light list is in colour, and gives an excellent idea of the high-class goods for which Messrs. Nicholls & Clarke are well known. It is not often nowadays that we get such complete catalogues of builders' materials, and the firm are to be congratulated on getting out such a comprehensive list.

ARCHITECTURAL
WOODWORK
SPECIAL FURNITURE
• MANTELS •
• CARVING •
DECORATING
FIBROUS PLASTER WORK
STAINED GLASS

THE ALLIED ARTS
&
CRAFTS GUILD

NORTHERN REPRESENTATIVE
Mr. H. W. BRANT
11, Manor Street
NEWCASTLE ON-TYNE

REGISTERED OFFICE
№ 4
BROOK STREET
SAINT PAUL'S
BIRMINGHAM
TELEPHONE:
CENTRAL. 3706
TELEGRAMS:
BEAUTIFY. B'HAM.

CURRENT PRICES FOR BUILDING WORK IN LONDON*

EXCAVATOR.

		s.	d.
Digging and throwing or wheeling and filling carts, and carting away to shoot—6 ft. deep	per yard cube	11	6
Add if in clay	" "	1	0
Add for every additional depth of 6 ft.	" "	0	6
Planking and strutting to trenches	per foot super	0	5
Do. to sides of excavation, including shoring	" "	1	0

CONCRETOR.

		s.	d.
Portland cement concrete in foundation 1 to 6 ..	per yard cube	35	0
Add if in underpinning in short lengths	" "	7	6
Add if in floors 6 in. thick	" "	3	6
Add if in beams	" "	4	0
Add if aggregate 1 : 2 : 4	" "	10	0
Add for hoisting not exceeding 10 ft. beyond the first 10 ft.	" "	3	3

BRICKLAYER.

		£	s.	d.
Reduced brickwork in lime mortar and Fletton bricks	per rod	30	0	0
Add if in stocks	"	7	10	0
Add if in Staffordshire blues	"	22	0	0
Add if in Portland cement and sand	"	2	0	0

FACINGS.

		s.	d.
Extra for facing in English or Flemish bond for every 10s. per 1,000 over the price of the common bricks	per ft. super	0	0	1½

POINTING.

		s.	d.
Neat flat struck or weathered joint	" "	0	0	3

ARCHES.

		s.	d.
Extra only to the price of ordinary brickwork :—			
Fair external in half brick rings	" "	0	0	10
Axed in stocks	" "	0	1	9
Rubbed and gauged jointed in putty camber or segmental	" "	0	6	0

SUNDRIES.

		s.	d.
Damp course in double course of slates breaking joint and bedded in Portland cement	" "	0	1	1
Setting ordinary register grates and stoves	each	1	0	0
Setting kitchener, including forming flues, &c., with all necessary fire bricks	"	4	15	0

ASPHALTER.

		s.	d.
Half-inch horizontal damp course	per yard sup.	4	3
Three-quarter-inch vertical damp course	" "	9	0
¾ inch on flats in two thicknesses	" "	6	6
Angle fillet	per foot run	0	3
Skirting and fillet 6 in. high	" "	1	3

MASON.

		s.	d.
York stone templates fixed	per foot cube	12	6
York stone sills fixed	" "	21	6
Bath stone and all labour fixed	" "	10	6
Portland stone fixed	" "	19	6

SLATER.

		s.	d.
Welsh 16 in. × 8 in. 3 in. lap, including nails....	per square	72	9
Do. 20 in. × 10 in. Do. Do.	"	80	9
Do. 24 in. × 12 in. Do. Do.	"	90	0

CARPENTER AND JOINER.

		s.	d.
Fir framed in plates	per foot cube	5	3
Do. joists	" "	5	9
Do. roofs, floors and partitions	" "	6	3
Do. trusses	" "	8	3

		¾"	1"	1¼"	2"
Deal rough close boarding	per sq.	38/-	44/-	50/-	80/-

		s.	d.
Flat centering for concrete floor, including struts or hangers .. "		50	0
Do. to beams	per ft. sup.	1	0
Centres for arches	"	1	6
Gutter boards and bearers	"	1	0

FLOORING.

		¾"	1"	1¼"	1½"
Deal-edges shot	per sq.		49/-	58/-	67/-
Do. tongued and grooved	"		54/-	65/-	72/-
Do. matchings	"	45/-	55/-		
Moulded skirting, including backings and grounds	per ft. sup.	1/6	1/9	2/0	2/6

SASHES AND FRAMES.

		s.	d.
One-and-a-half moulded sashes or casements	per foot super	1	10
Two Do. Do. Do.	" "	2	1
Add for fitting and fixing	" "	0	4
Deal-cased frames with 1 in. inner and outer linings, 1½ in. pulley stiles tongued to linings, hard wood sills with 2 in. moulded sashes in squares double hung, double hung with pulleys, lines and weights; average size	" "	3	9

DOORS.

		1½"	1¾"	2"
Two-panel square framed	per ft. sup.	2/1	2/4	2/6
Four-panel Do.	"	2/5	2/8	2/11
Two-panel moulded both sides	"	2/8	2/11	3/2
Four-panel Do. Do.	"	2/11	3/2	3/5

CARPENTER AND JOINER—continued.

FRAMES.

		s.	d.
Deal wrot moulded and rebated	per foot cube	14	0

		1"	1¼"	1½"
Plain deal jamb linings framed	per ft. sup.	1/8	1/9	2/0
Deal shelves and bearers	"	1/5	1/7	1/10
Add if cross tongued	"	2d.	2d.	2d.

STAIRCASES.

		1"	1¼"	1½"	2"	2½"
Deal treads and risers in and including rough brackets		2/1	2/4	2/9	—	—
Deal strings wrot on both sides and framed		1/8	2/-	2/2	2/8	—

		s.	d.
Housings for steps and risers	each	0	11
Deal balusters, 1 in. × 1¼ in.	per ft. run	0	9
Mahogany handrail; average 3 in. × 3 in.	" "	6	0
Add if ramped	" "	11	10
Add if wreathed	"	23	9

FIXING ONLY IRONMONGERY (INCLUDING SCREWS).

6 in. barrel bolts	8½d.	Rim locks	2/4
Sash fasteners	11½d.	Mortice locks	5/3
Casement fasteners	1/5	Patent spring hinges and letting in to floor and making good	19/-
Casement stays	1/2		
Cupboard locks	1/5		

FOUNDER AND SMITH.

		s.	d.
Rolled steel joists	per cwt.	17	0
Plain compound girders	"	20	0
Do. stanchions	"	23	0
In roof work	"	28	0

RAIN-WATER GOODS.

		3"	4"	5"	6"
Half-round plain rebated joints ..	ft. run	1/11	2/4½	3/7	4/-
Ogee Do. Do. ..	"	2/4½	3/1	3/10	4/9
Rain-water pipes with ears	"	2/9	3/7		
Extra for shoes and bends	each	4/4	5/11		
Do. stopped ends	"	1/11	2/4½	3/7	4/-
Do. nozzles for inlets	"	2/2	2/7	3/10	4/3

PLUMBER.

		s.	d.
Milled lead and laying in flashings and gutters	per cwt.	59	0
Do. Do. in flats	"	57	0
Extra labour and solder in coated cesspools	each	6	9
Welt joint	per ft. run.	0	6
Soldered seam	" "	1	6
Copper nailing	" "	0	6

		½"	¾"	1"	1½"	2"	4"
Drawn lead waste	per ft. run	1/1	1/9	1/11	3/5	4/2	
Do. service	"	1/8	2/2	2/7	3/10		
Do. soil	"						7/6
Bends in lead pipe	each					3/3	8/3
Soldered stop ends	"	1/2	1/8	2/1	2/10	3/6	
Red lead joints	"	11d.	1/-	1/3	1/11	2/4	4/10
Wiped soldered joints	"	2/10	3/6	4/-	4/11	6/6	9/9
Lead traps and cleaning screws	"				14/7	19/6	
Bib cocks and joints	"	6/4	9/7	15/4	41/-		
Stop cocks and joints	"	15/4	17/2	25/8	64/-		

PLASTERER.

		s.	d.
Render, float and set in lime and hair	per yard sup.	2	2
Do. Do. Sirapite	" "	2	4
Do. Do. Keen's	" "	3	3
Add sawn lathing	" "	1	5
Add metal lathing	" "	2	3
Portland cement screed	" "	1	10
Do. plain face	" "	3	0
Mouldings in plaster	per 1 girth	0	1½
One-and-a-half granolithic pavings	per yard sup.	5	9

GLAZIER.

		s.	d.
21 oz. sheet plain	per foot sup.	0	8
26 oz. Do.	" "	1	0
Obscured sheet	" "	1	1
¼ in. rolled plate	" "	0	9
¼ in. rough rolled or cast plate	" "	0	10½
¼ in. wired cast plate	" "	1	4

PAINTER.

		s.	d.
Preparing and distempering, 2 coats	per yard sup.	0	9
Knotting and priming	" "	0	7
Plain painting 1 coat	" "	0	9
Do. 2 coats	" "	1	2
Do. 3 coats	" "	1	9
Do. 4 coats	" "	2	4
Graining	" "	2	3
Varnishing twice	" "	1	9
Sizing	" "	0	5
Flatting	" "	0	7
Enamel	" "	1	1
Wax polishing	per foot sup	0	6
French polishing		1	2
Preparing for and hanging paper	per piece 2/- to 4/-		

* These prices apply to new buildings only. They cover superintendence by foreman and carry a profit of 10% on the prime cost without establishment charges. A percentage of 1½ should be added for Employers' Liability and National Health and Unemployment Acts and from 1s. 6d. per £100 for Fire Insurance. The whole of the information given on this page is copyright.

PATENTS

APPLICATIONS PUBLISHED.*

218,152.—W. H. Wilkinson and G. J. Milne: Foldable boxes and cases.

218,155.—W. Marshall: Barless fixtures for domestic fireplaces.

218,159.—R. H. Rogers: Concrete paving and floors.

218,163.—W. A. Gunn: Method of making top construction for desks, tables, stands, and counters.

208,120.—G. P. Lievre: Automatic securing-device for hinged doors, windows and panels.

218,174.—C. Camplin: Stone-sawing machines.

218,202.—J. Fowler & Co. (Leeds), Ltd., and C. M. Wilcock: Loading apparatus for concrete.

218,366.—Jackson & Ogden, Ltd., and F. T. Kale: Locking mechanism for lifts, hoists, &c.

218,495.—S. E. Sieurin: Manufacture of fire-proof bricks.

218,513.—T. Sanders: Casement stays and fasteners.

218,525.—Electric Printing Works, Ltd., and J. S. D. Hives: Folding boxes.

218,535.—C. C. Korgaard and C. F. E. Larsen: Flushing cisterns for water closets.

205,808.—Method of manufacturing artificial wood.

218,541.—L. Schlesinger: Supply and waste fittings for lavatory basins.

206,167.—A. Esterak and H. Esterak: Chimney cowls.

208,522.—G. Lyon: Artificial seasoning of wood, and apparatus therefor.

218,566.—L. De Brouckere and Etablissements Recherches and Constructions Scientifiques Soc. Anon.: Drawing table or desk.

212,877.—Dorr Co.: Process for the manufacture of whiting.

212,224.—J. Wildman: Sanitary closets.

218,578.—Hobbies, Ltd., and H. Jewson: Supporting members for chairs, tables, desks, and other articles of furniture.

218,590.—G. Bailey: Boilers of kitchen ranges.

211,155.—H. Conradi: Centrifugal manufacture of reinforced-concrete pipes.

218,599.—R. E. Malkin, A. M. Malkin, and C. W. Malkin: Combination settee (couch or sofa), and table.

218,607.—A. Chatwin and Kingfisher, Ltd.: Hinged joint for school seats, desks.

214,633.—T. L. Smith & Co.: Concrete-mixing machines.

219,169.—F. H. Jones: Concrete beams and slabs for floors, roofs and ceilings.

219,232.—H. C. Highmiller: Window scaffolding.

212,236.—Anaconda Sales Co.: Roofing-strips.

219,141.—F. G. Brown: Floor waxing and polishing device.

219,144.—F. C. Cross (H. J. S. Cross): Combined floor waxer and polisher.

219,150.—S. E. Finley: Bituminous cement-aggregate composition.

219,166.—W. A. Rawlings and Taroads Syndicate, Ltd.: Travelling spraying machines.

219,186.—Sir T. H. Spencer and J. Spencer, Ltd.: Arms and brackets for attachment to poles.

219,240.—J. Southall: Washers for washing gravel and sand.

219,241.—J. H. Ewart: Water and gas taps for water-heaters and geysers.

219,369.—R. D. Pike: Method and apparatus for producing calcining and clinkering material.

219,409.—P. Van Leeuwen: Benches and like appliances for use in teaching carpentry.

219,416.—M. R. Hutchinson: Turnstiles or pivoted gates.

219,482.—B. Talbot: Coating of iron or steel with concrete or pitch.

219,485.—F. G. Shearley: Drain and like pipes.

218,501.—G. A. Wall and E. Babidge: Fastening devices, more particularly adaptable for use with scaffolding and staging.

* All these applications are now in the stage in which opposition to the grant of Patents upon them may be made.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach him not later than Tuesday evening.

* Denotes *accepted*. † Denotes *provisionally accepted*.
‡ Denotes *recommended for acceptance*.
§ Denotes *accepted subject to modifications*.

AMERSHAM.—For tiling eight cottage roofs at Little Amersham, for the R.D.C.:—
*Parsons £245

BEDFORD.—Alteration to Newnham House, for T.C.:—
*S. Freshwater & Sons £376

BEXHILL.—For making-up Brockley-road, Coodendrive, Egerton-road, Knebworth-road, Sutherland-avenue, Terminus-avenue, and Warwick-road, for the T.C.:—

W. J. Simms	£25,285 0 0
J. Bodle, Ltd.	22,629 0 0
Black Rock Quarries, Ltd.	21,484 9 0
A. Saunders	19,930 0 0
Smith Wright & Co.	17,134 18 9
*S. Carey, Bexhill	16,209 8 0

BILLINGHAM.—For 150 conversions, for the U.D.C.:—
*J. McNeil £753 17

BRADFORD.—For transformer chamber in Otley-road, for the Electricity Committee:—
Mason—*J. & P. Obank, Bradford.
Asphalter—*Tunstall's Seyssel & Limmer Rock Asphalte Co., Ltd., Leeds.

BRADFORD.—For extensions at Bradford Technical College, for the City Architect's Department:—
†Chas. Booth & Son, Bradford.

BRISTOL.—For Shelter in Evans Park, for T.C.:—
*Bray & Slaughter £363

BRISTOL.—Erection of the following houses for T.C.: Shirehampton site, 94 houses, concrete construction; Horfield site, 176 houses, concrete construction, 26 houses, brick construction—Total 296:—
*John Knox £126,920

BRISTOL.—Sanitary conveniences at Canford Park, for T.C.:—
*Bray & Slaughter £298

BURNLEY.—For work in connection with the erection of a sub-station near Rose-grove:—
Mason's, &c., work—
B. Smith & Son £686

BURTON-ON-TRENT.—For erection of a fish market, for the T.C.:—
*A. Holmes & Sons, Dallow Bridge.. £2,675

CARLISLE.—For construction of new masonry and concrete retaining wall, and the necessary filling to form the new approach at the south end of St. Nicholas Bridge, for the T.C. Mr. H. C. Marks, City Engineer, 18, Fisher-street:—
*John Laing & Son, Ltd., Carlisle.... £2,254

CHELMSFORD.—For the erection of a boundary wall, for the T.C.:—
*W. A. Claydon, Ulting £972

CHESTERFIELD.—For erection of an underground convenience in New-square, for the T.C. Mr. V. Smith, Borough Engineer, Town Hall:—

Blythe & Sons, Mansfield	£6,696 0 0
Lehane & Co., Darley Dale	6,084 7 3
C. E. Gaunt, Chesterfield	5,524 0 0
W. G. Robson, Sheffield	5,197 0 0
*J. Wright, Chesterfield	4,698 16 0

CROWMARSH.—For erection of 10 houses at South Stoke, for the R.D.C. Messrs. J. G. T. West & Son, architects, Abingdon. Quantities by architects:—

A. Cox, Henley-on-Thames	£5,996 2
Francis Bros., Tilehurst	5,270 0
Hinkins & Frewin, Oxford	5,130 0
Brasher & Sons, Wallingford	5,095 0
Kirby & Sons, Wallingford	4,998 0
Boshers, Ltd., Wallingford	4,950 0
Randall's Executors, Abingdon	4,900 0
J. W. Beeson, Pangbourne	4,899 0
†P. R. Gutteridge, Pangbourne	4,340 0

DONCASTER.—For 400 concrete houses, for the Corporation:—
For 180 "A.N." and 120 "A.S." Type, in concrete—
*F. Bate, Doncaster £127,546
For 100 "B." Type—
*Swift Bros. & Haslam, Doncaster .. £48,372

DUNDALK.—For erection of premises at 99, Clanbrassil-street, for Messrs. P. McGorisk & Co., Ltd. Messrs. Morris & Kavanagh, quantity surveyors, Harcourt-street, Dublin:—
*T. McDonald & Sons, Ltd., Dundalk £4,779 5 8

FITZWILLIAM (YORKS).—For picture house at Fitzwilliam, near Pontefract. Messrs. Garside & Pennington, architects, Ropergate, Pontefract:—
*G. Waller, South Elmsall.

GUILDFORD.—For making-up footpaths at Guildford Park, for the T.C.:—

Swinford, Powell & Morrison	£180
Streeter & Co.	175
*Franks, Harris Bros.	150

GUILDFORD.—For repairs to Woking-road, for the T.C.:—
*W. Manders & Co. £3,942 10 6

HALIFAX.—For alterations to Brearley's warehouse, Bull Green, for the T.C.:—
Mason—
*Jagger Bros., Ringby £2,303 0 0
Joiner—
*J. Lees & Sons, Halifax 278 15 6
A. Higginbotham & Sons, Holmfield ..... —

HASTINGS.—For widening of Red Lake-road and construction of new roadway, for the T.C.:—
*L. J. Speight, Ltd., London.... £19,980 1

HASTINGS.—Construction of public conveniences, &c., at the Pilot Fields, for T.C.
‡Simms, Sons & Cooke, Ltd., Nottingham £1,250

HEREFORD.—For conversion of the present Isolation Block into an operating theatre, for the General Hospital. Messrs. Nicholson & Clark, architects, Cathedral Chambers, King-street:—

Wilks, Son & Peake, West End Works	£6,148
Beavan & Hodges, Ltd., Victoria-street	5,325
W. Bowers & Co., Bath-street	5,246
W. Powell & Sons, Whitehorse-street	5,168
*Charles Cooke & Co., St. Owen-street, Hereford	5,014

HIGHFIELDS.—For erection of 18 houses at Hamel Rise, for the Hemsworth U.D.C.:—

De Burgh & Sprakes, Doncaster	£9,119 5
G. B. Hillier, Hemsworth	9,000 0
W. Hanley & Sons, Hemsworth	9,000 0
*W. Jennings & Sons, Barnsley	7,915 0

ILFORD.—Extension of Goodmayes electricity sub-station, for U.D.C.:—
*Hammond & Mills, Ltd. £3,850

IPSWICH.—For rebuilding bridge over Belstead Brook, for the T.C. and East Suffolk C.C.:—
*A. E. Farr, London £910 10

KEIGHLEY.—For alterations at the Town Hall, for the T.C.:—
Mason—
*A. Sharpe, Oakworth £136
Joiner—
*Pearson & Wharton, Keighley..... 340

LEEDS.—For erection of offices, for Messrs. Timothy, Newby & Sons, Ltd., Boar-lane, Leeds:—
*Wm. Gott & Son, Leeds.

LEEDS.—For reconstruction of "Leeds Arms" hotel, West-street, for Messrs. Wm. Whittaker's Brewery Co., Ltd., Bradford. Messrs. Wm. Illingworth & Son, architects, Sunbridge-road, Bradford:—
*John Leach, Bradford £3,400

LIVERPOOL.—For erection of baths and wash-houses in Minshull-street, Low-hill, for the T.C.:—
‡Hughes & Stirling £15,591

LLANDUDNO.—Parade and promenade extension at Craig-y-don, for U.D.C.:—
‡Alex Williams and W. Thomas, Llandudno £2,899

LONDON.—For the erection of four cottages and 36 flats on the St. Quintin Estate Housing Scheme, for the Kensington B.C.:—

Henry Knight & Son	£25,029 0
Harry Neal, Ltd.	25,000 0
Ross & Son	24,126 0
William Moss & Sons, Ltd.	23,656 11
A. Roberts & Co., Ltd.	23,400 0
Patman & Fotheringham, Ltd.	22,810 0
F. G. Coxhead	22,363 0
Perry Bros.	22,026 0
*F. D. Hidden & Co., Ltd.	21,280 0

LUTON.—For converting Plait Hall into a covered market, for the T.C.:—
*Luton Building Co. £5,147

LUTON.—For erection of an administrative and cubicle blocks at Spittlesea Hospital, for the T.C. Mr. J. W. Tomlinson, Borough Engineer, 1, Cheapside, Luton:—

	Administrative Block.	Cubicle Block.
A. W. Butt	£6,474 0	£1,990 0
A. Carter	6,578 0	1,763 0
J. T. Garrett	5,827 0	1,705 0
H. Lacey & Sons	6,595 0	1,850 0
Luton Building Co.	7,158 0	2,500 0
C. Miskin & Sons	5,800 0	1,835 0
A. W. Oakley	5,762 0	1,659 0
E. Pryer	5,734 0	1,795 0
J. Tomkins & Sons	5,881 0	1,762 0
C. Wood & Sons	7,055 7	2,456 14
*C. H. White	5,720 0	1,645 10

MAIDENHEAD.—For erection of a new scarlet fever block at the Isolation Hospital in St. Mark's-road, for the T.C. Mr. H. E. Davies, Town Clerk, Guildhall. Quantities by Mr. Frank Woods, 3, High-street, Maidenhead:—

Cox & Sons	£4,130 9 11
Wm. Creed & Co.	3,993 0 0
W. A. James & Sons	3,987 0 0
J. K. Cooper & Sons	3,972 0 0
Halfacre & Young,	3,958 0 0
*Cripps & Green	3,922 0 0

(All of Maidenhead.)

MANCHESTER.—1,000 3 in. cast iron pipes, for the T.C.:
*Staveley Coal and Iron Co.—£11 17s. 6d. per ton.

MOUNTAIN ASH.—For erection of 26 houses at Penrhiwceiber. Mr. W. H. Williams, Architect, Town Hall :—

*Hawkins & James, Merthyr Tydfil.. £13,280

NEWMARKET.—For erection of 12 houses at the Rows, for the U.D.C. Mr. W. H. Eley, Godolphin House :—

†Linzell & Edmondson, Newmarket £6,085 10

OLDHAM.—For erection of a boundary wall at Watersheddings Recreation Ground :—

†J. Spencer & Bros., Ltd.

OLDHAM.—For laying-out playing fields at Heron-street School, for the T.C. :—

†J. & J. Spencer.

PONTEFRACT.—For rebuilding "Turk's Head" hotel, Gillygate, for Messrs. Carters, Knottingley Breweries, Ltd. Messrs. Garside & Pennington, architects, Pontefract :—

*G. Ward, Pontefract.

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PORTISHEAD.—For erection of 10 cottages in South-road, for the U.D.C. Mr. F. H. Smith, Surveyor, Council Offices :—

E. Walters & Son, Bristol	£5,950
W. J. Kew, Bristol	5,785
W. Hinton, Portishead	5,363
*Burston & Hawkins, Clevedon	4,873

PORTSMOUTH.—For alterations at "Tower House," for W. L. Wylie, R.A. Mr. A. E. Tutte, architect, 30, Commercial-road, Portsmouth :—

F. J. Privett	£837 0 0
Jno. Croad	748 0 0
Tanner Bros.	741 0 0
Jno. Crockerell	733 0 0
John Lay & Co.	537 3 5
A. E. Porter	525 13 2
*E. A. Sprigings	520 8 6

PORTSMOUTH.—For alterations at No. 6, Auckland-road, West Southsea, for Lieut.-Col. E. A. Bourke. Mr. W. J. Wakely, architect, Portsmouth :—

H. Reynolds	£846 0
John Lay & Co.	660 10
Light Bros. & Flowers	646 12
*A. H. Jordan, Ltd.	620 0

ROCHDALE.—For external painting work on (*a*) 118 houses on Ivor-street, and (*b*) Kilworth-street Estates, for the T.C. The Borough Surveyor, Town Hall :—

(*a*) *W. Webster, Rochdale.
(*b*) *W. H. Duckworth, Rochdale.
*Hill Bros., Rochdale.

RUGBY.—For additions to the Union Infirmary, for B.G. Mr. J. W. Pendred, Clerk, Union Offices :—

*Parnell & Son, Rugby £9,632

SHEFFIELD.—For erection of a new telephone exchange at Sheffield Beauchief, for H.M. Office of Works :—

W. & A. Forsdike, Ltd., Sheffield.

SHEFFIELD.—For supply of 500 4 in. cast-iron pipes, for the T.C. :—

*Staveley Coal & Iron Co., Chesterfield £544 14

SHEFFIELD.—For repairs to premises in Limbrick-road, for the T.C. :—

*T. Owen £463 10

SOUTHEND-ON-SEA.—For erection of 55 houses, for the Corporation. Mr. R. H. Dyer, Borough Engineer, Town Hall :—

*Johns Bros., Woolwich £26,332 10 8

SOUTH SHIELDS.—Erection of steel fire escape balcony and staircase at sanatorium, for T.C. :—

*M. Aynsley & Sons, Newcastle-on-Tyne £832

TWICKENHAM.—For wood paving in the district, for the U.D.C. :—

†G. Wimpey & Co., Ltd. £22,300

WAKEFIELD.—For laying the 4 in. water main at Black-lane, for the R.D.C. :—

*Wilson Bros. £158

WANDSWORTH.—For additional baths for women at Tooting, for the B.C. :—

*J. Potterton & Sons £2,155 12

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WEST HARTLEPOOL.—For the erection of two sub-stations for the T.C. :—

*C. Turnbull, West Hartlepool—

Chatham-road	£174 3
Milton-road	257 5

WOLSTANTON.—For the completion of the Wolstanton to Chesterton new road, for the U.D.C. :—

Coxhead & Co.	£12,254 13 0
S. W. Carryer & Co.	12,254 13 0
J. Riley & Son	10,600 0 0
Saunders & Torrence	9,974 14 9
Inchley & Co.	9,195 4 0
A. Monk & Co.	8,180 0 0
D. Carson	8,120 0 0
R. Douglas	8,067 12 9
‡J. Taylor	7,500 0 0

YORK.—For erection of Nurses' Home in Heslington-road, York :—

*Wm. Birch & Son, Ltd., York.

YORK.—Provision of assembly hall at Nunthorpe Secondary School, for E.C. :—

*Henry Colman & Sons £1,388 9 6

YORK.—Lavatory accommodation at Nunthorpe Secondary School, for E.C. :—

*Fairweather & Sons, Ltd. £1,118 6 11

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